IEI Technology Corp.

MODEL:

# ACT-08A-CX2

## Fanless All-in-one Access Control Terminal with VIA Eden™ CPU, Touch Screen, Wireless LAN, RFID Reader, Digital Camera and Microphone

# User Manual

Rev. 1.01 September 2008

RoHS Lead Free

# Revision

| Date | Version | Changes |
|---|---|---|
| 2008-09 | 1.01 | Modified COM 1 and COM 2 locations<br>Modified the preinstalled SO-DIMM SDRAM to 512 MB<br>Added RS-422 and RS-485 pinouts |
| 2008-08 | 1.00 | Initial release |

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# Manual Conventions

**WARNING!**

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously. Warnings are easy to recognize. The word “warning” is written as “**WARNING**,” both capitalized and bold and is followed by text. The text is the warning message. A warning message is shown below:

**WARNING:**

This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the ACT-08A-CX2 or personal injury to the user. Please take warning messages seriously.

**CAUTION!**

Cautionary messages should also be heeded to help reduce the chance of losing data or damaging the ACT-08A-CX2. Cautions are easy to recognize. The word “caution” is written as “**CAUTION**,” both capitalized and bold and is followed. The italicized text is the cautionary message. A caution message is shown below:

**CAUTION:**

This is an example of a caution message. Failure to adhere to cautions messages may result in permanent damage to the ACT-08A-CX2. Please take caution messages seriously.

**NOTE:**

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes. Notes are easy to recognize. The word “note” is written as “**NOTE**,” both capitalized and bold and is followed by text. The text is the cautionary message. A note message is shown below:

**NOTE:**

This is an example of a note message. Notes should always be read. Notes contain critical information about the ACT-08A-CX2. Please take note messages seriously.

# Packing List

**NOTE:**

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the ACT-08A-CX2 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The items listed below should all be included in the ACT-08A-CX2 series package.

- 1 x ACT-08A-CX2 system
- 1 x Screw set
- 1 x Power adapter
- 1 x eSATA cable
- 1 x Touch pen
- 1 x User Manual and driver CD

Images of the above items are shown in **Chapter 3** on **page 21**.

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Chapter

1

# Introduction

## 1.1 ACT-08A-CX2 All-in-One Access Control Terminal

**Figure 1-1: ACT-08A-CX2 All-in-One Access Control Terminal**

The ACT-08A-CX2 is VIA Eden™ 1 GHz ULV powered access control terminal with a RFID reader and a rich variety of functions. The ACT-08A-CX2 is designed for easy and simplified integration in to access control applications.

A VIA CX700M chipset ensures optimal memory, graphics, and peripheral I/O support. The system comes with 512 MB of preinstalled DDR2 SDRAM and supports a maximum of 1.0 GB of DDR2 SDRAM ensuring smooth data throughputs with reduced bottlenecks and fast system access.

Two serial ports and four external USB 2.0 ports ensure simplified connectivity to a variety of external peripheral devices. Wi-Fi capabilities and an RJ-45 Ethernet connector ensure smooth connection of the system to an external LAN.

### 1.1.1 Features and Model Variations

The ACT-08A-CX2 features the following:

- 8.4” TFT LCD with resistive type touch screen
- VIA Eden™ 1 GHz ULV CPU preinstalled
- Built-in RFID reader supports Mifare card and EM card read/write
- Preinstalled 512 MB DDR2 memory module
- 802.11 b/g wireless module
- One RS-232 port and one RS-232/422/485 port
- Four standard USB 2.0 ports
- CompactFlash® Type II slot
- Provides RFID configuration tool to read or write Mifare tags and EM tags
- Built-in digital camera and microphone
- Built-in two 2.0 W stereo speakers
- IP 64 compliant front panel
- Second displays support
- RoHS compliance

### 1.1.2 Applications

The ACT-08A-CX2 is elegant yet sophisticated systems that are easily implemented in diverse environments including:

- Door access
- Time attendance
- Cashless payment terminal
- Parking access control

## 1.2 External Overview

### 1.2.1 General Description

The stylish ACT-08A-CX2 access control terminal comprises of a screen, rear panel, top panel, bottom panel and two side panels (left and right). An ABS/PC plastic front frame surrounds the front screen. The rear panel provides screw holes for a wall-mounting bracket compliant with VESA FDMI standard. An I/O interface panel on the rear panel of

the ACT-08A-CX2 provides access to external interface connectors that include LAN, USB 2.0, serial port, reset button, power connector and power switch.

### 1.2.2 Front Panel

The front side of the ACT-08A-CX2 is a flat panel TFT LCD screen surrounded by an ABS/PC plastic hard cover . The top of the front panel has one 300 K pixel digital camera , two microphones and one power LED indicator. The bottom of the front panel features a RFID reader for Mifare/EM tag and two speakers for stereo sound (**Figure 1-2**).

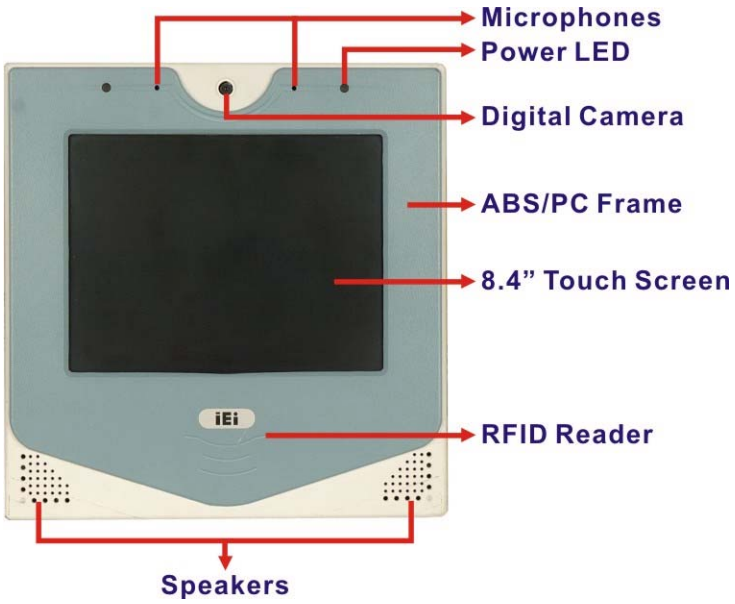



**Figure 1-2: ACT-08A-CX2 Front View**

### 1.2.3 Rear Panel

The rear panel provides access to retention screw holes that support the VESA MIS-D 75 mounting. Refer to **Figure 1-3**.

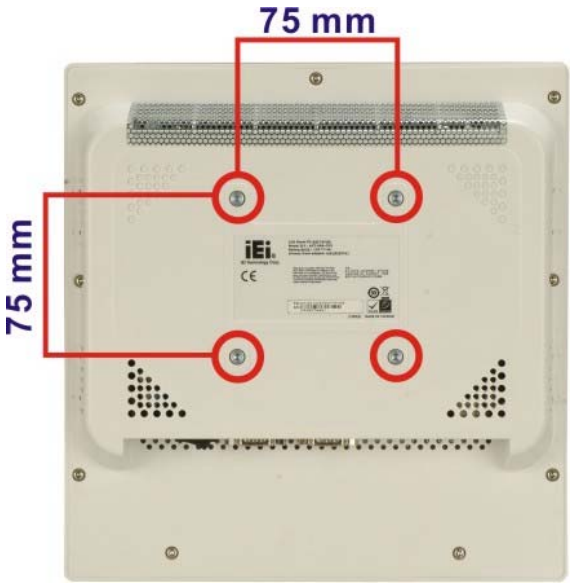



**Figure 1-3: ACT-08A-CX2 Rear View**

### 1.2.4 Bottom Panel

The I/O interface panel located on the bottom panel of the ACT-08A-CX2 (**Figure 1-4**) has the following I/O interface connectors:

- 1 x 12 V DC power jack
- 1 x Power switch
- 1 x External SATA connector
- 1 x RS-232 port
- 1 x RS-232 or RS-422/485 port
- 1 x GbE connector
- 4 x USB 2.0 ports
- 1 x Reset button

The external I/O interface connectors on the rear panel are shown in **Figure 1-4**.

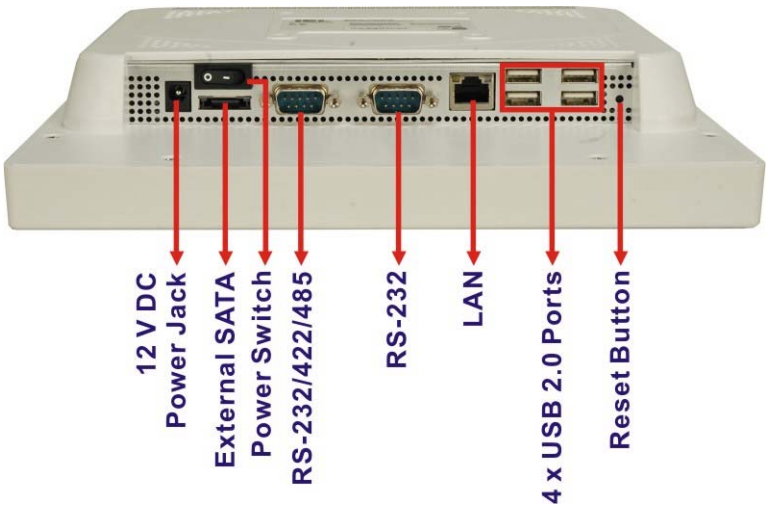



**Figure 1-4: ACT-08A-CX2 Bottom View**

### 1.2.5 Side Panels

The two side panels of the ACT-08A-CX2 provides access to slots that support panel mount and rack mount. See **Figure 1-5**.

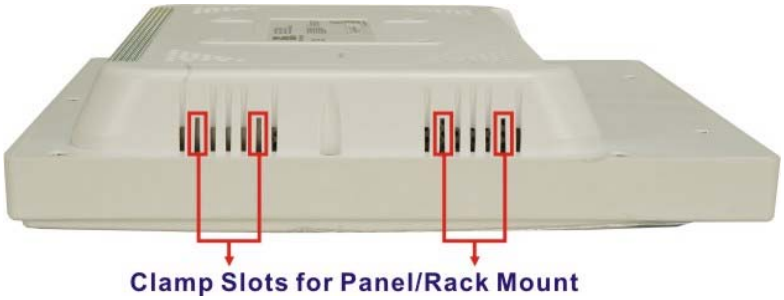



**Figure 1-5: ACT-08A-CX2 Side View**

## 1.3 Internal Overview

The ACT-08A-CX2 has the following components installed internally:

- 1 x Motherboard
- 1 x 512 MB DDR2 SDRAM SO-DIMM
- 1 x Wireless module
- 1 x RFID reader

- 2 x Speakers
- 1 x Digital camera
- 2 x Microphones

## 1.4 Specifications

### 1.4.1 Preinstalled Hardware Components

The ACT-08A-CX2 has the following preinstalled components:

- 1 x Motherboard
- 1 x TFT LCD screen
- 1 x Touch screen
- 1 x Inverter
- 1 x Wireless LAN module
- 1 x DDR2 memory module
- 1 x AT/ATX switch

The following section lists the system specifications. The technical specifications for some other preinstalled components are shown in the **Appendix A**.

### 1.4.2 System Specifications

The technical specifications for the ACT-08A-CX2 system are listed in **Table 1-1.**

| Specification | ACT-08A-CX2 |
|---|---|
| LCD Size | 8.4” |
| Max. Resolution | 800 x 600 (XGA) |
| Brightness | 400 cd/m$^2$ |
| Contrast Ratio | 500:1 |
| LCD Color | 262 K |
| Pixel Pitch (mm) | 0.213 (H) x 0.213 (V) |

| | |
|---|---|
| **Viewing Angle (H-V)** | 120 (H) / 100 (V) |
| **Backlight MTBF** | 50,000 hours |
| **SBC Model** | AFLMB-CX2 |
| **CPU** | 1 GHz VIA Eden™ ULV |
| **GMCH** | VIA CX700M |
| **Memory** | One 512 MB DDR2 SDRAM SO-DIMM pre-installed (system max. 1 GB) |
| **SSD** | CF Type II |
| **Watchdog Timer** | Software Programmable supports 1 sec. ~ 255 sec. system reset |
| **Audio** | AMP 2.0 W + AMP 2.0 W (built-in stereo speakers) |
| **Expansion** | 1 x Mini PCI slot (for wireless LAN 802.11 b/g module) |
| **Bluetooth** | Supports Bluetooth connectivity |
| **Camera and MIC** | Built-in 300 K pixel camera and digital microphone |
| **RFID** | Supports MIFARE and EM RFID |
| **Construction Material** | ABS + PC plastic front frame<br>Aluminum alloy chassis |
| **Front Panel Color** | Blue and White |
| **Mounting** | Panel, Wall, Stand or Arm (VESA MIS-D 75) |
| **Dimensions (W x H x D) (mm)** | 244.69 x 251.72 x 53.3 |
| **Operation Temperature** | 0ºC ~ 45ºC |
| **Net weight** | 1.1 kg |
| **IP level (front panel)** | IP 64 |
| **EMC** | CE, EMC and FCC |

| | |
|---|---|
| **Safety** | CB and CCC |
| **Touch Screen** | 4-wire resistive type |
| **Power Adapter** | 48 W |
| **Power Consumption** | 38 W |
| **I/O Ports and Switches (Rear Panel)** | 1 x 12 V DC power jack |
| | 1 x Power switch |
| | 1 x External SATA connector |
| | 1 x RS-232 port |
| | 1 x RS-232 or RS-422/485 port |
| | 1 x GbE connector |
| | 4 x USB 2.0 |
| | 1 x Reset button |

**Table 1-1: ACT-08A-CX2 System Specifications**

Chapter

2

# Detailed Specifications

## 2.1 Dimensions

The following sections provide detailed schematics and information on the dimensions of the ACT-08A-CX2.

### 2.1.1 ACT-08A-CX2 Dimensions

The dimensions of the ACT-08A-CX2 are shown in **Figure 2-1** and listed below.

- **Width**: 244.69 mm
- **Height**: 251.72 mm
- **Depth**: 53.3 mm

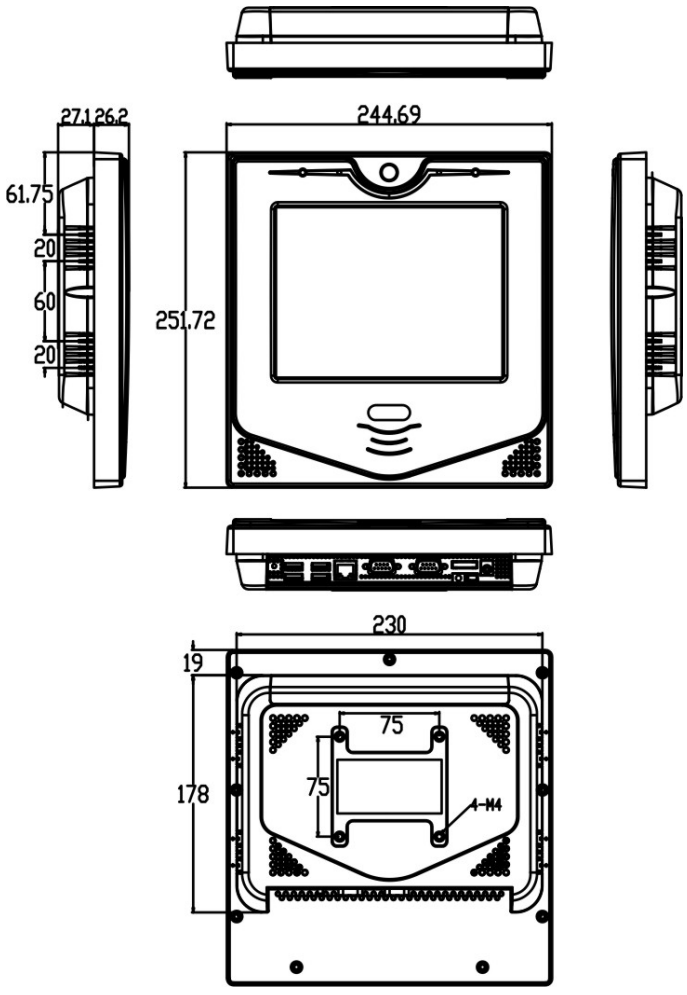



**Figure 2-1: ACT-08A-CX2 Dimensions (mm)**

## 2.2 Processor Support

A VIA Eden™ ULV processor is installed in the system. The processor has a CPU speed of 1.0 GHz and a 400 MHz FSB.

VIA Eden™ ULV processor supports the following VIA features:

- 90 nanometer process technology
- VIA CoolStream™ architecture minimizes power consumption
- VIA StepAhead™ technology
- VIA PadLock™ security engine

## 2.3 Motherboard Components

The following sections describe some of the features on the motherboard.

### 2.3.1 Memory Support

#### 2.3.1.1 Installed Memory

One 512 MB DDR2 SDRAM SO-DIMM is installed in the ACT-08A-CX2 and controlled by the Northbridge installed on the internal motherboard.

#### 2.3.1.2 Maximum Memory

The VIA CX700M is capable of supporting one 200-pin 1.0 GB (system max.) DDR2 SDRAM SO-DIMM. If different memory is required, please contact an IEI sales representative and discuss the necessary system requirement.

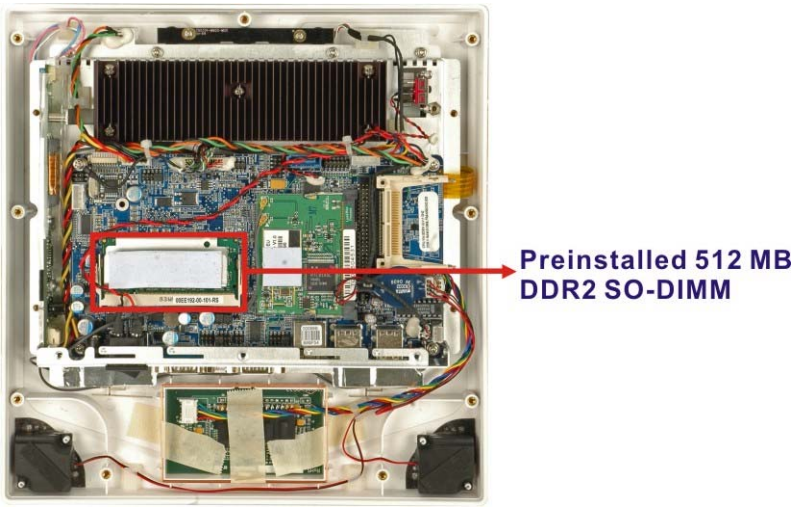



**Figure 2-2: Memory Module and Memory Socket**

### 2.3.2 Storage Capacity

The system can also support a CompactFlash® Type II (CF Type II) memory disk (**Figure 2-3**).

**Figure 2-3: CompactFlash® Slot**

## 2.4 ACT-08A-CX2 Front Side

### 2.4.1 Monitor

An 8.4” SVGA LCD screen is installed on the front of the ACT-08A-CX2. The installed monitor has a pixel resolution of 800 x 600 pixels with 400 nits high brightness. The screen is shown in **Figure 2-4** below.

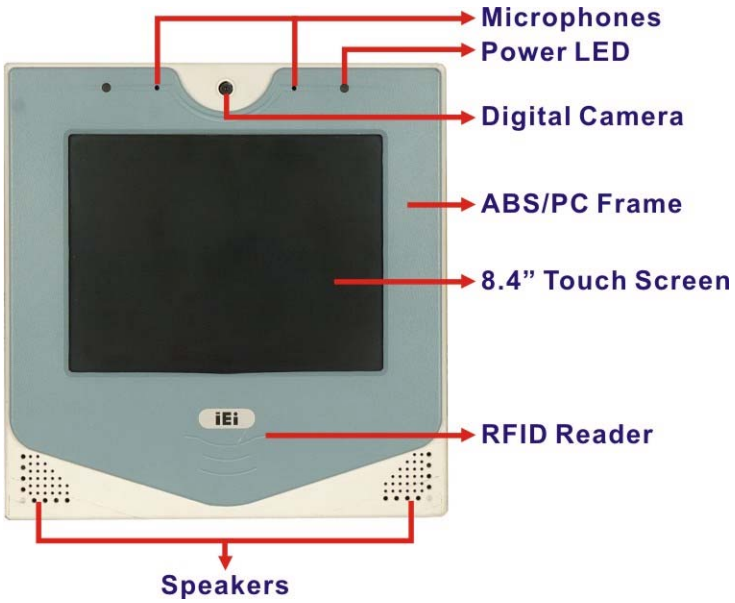



**Figure 2-4: SVGA Screen**

### 2.4.2 Touch-Screen Module

A controller for the 4-wire resistive touch screen is connected to the motherboard through the RS-232 interface. The sensitive touch screen is accurate, reliable and durable.

### 2.4.3 RFID Reader

A RFID reader is integrated in the front panel and supports Mifare 13.56 MHz or EM 125 KHz RFID tags. The ACT-08A-CX2 also came with a RFID tool to read or write data on or into the Mifare tags or EM tags. Please refer to **Chapter 5** for detailed description of the RFID tool (RF320).

### 2.4.4 Digital Camera and Microphone

The ACT-08A-CX2 is built in with a 300 K digital camera and a set of microphone on the front panel (**Figure 2-4**). The user can use the camera and microphone for facial and voice recognition for access control applications.

### 2.4.5 Stereo Speakers

Two 2.0 W stereo speakers on the front side of the ACT-08A-CX2 are interfaced to the system through a class-B dual output amplifier (**Figure 2-4**).

## 2.5 External Peripheral Interface Connectors

The following section describes the external peripheral interface connectors on the bottom panel of the ACT-08A-CX2.

### 2.5.1 Serial Port Connectors

The ACT-08A-CX2 has two serial ports on the bottom panel. One of these ports (COM 1) is RS-232 only port and the other serial port (COM 2) can be configured as a RS-232, RS-422 or an RS-485 serial port.

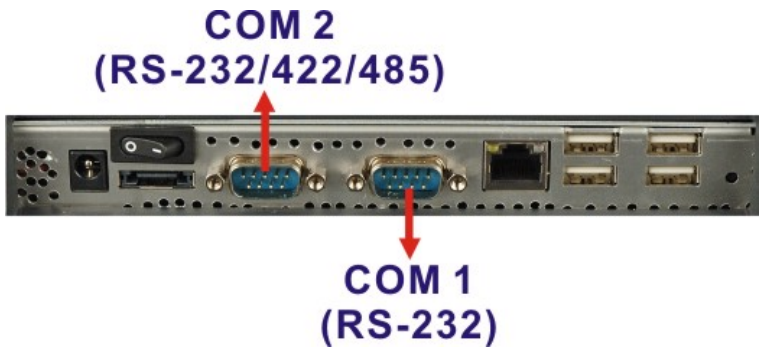



**Figure 2-5: COM Ports**

### 2.5.2 LAN Connectivity

The ACT-08A-CX2 supports GbE connectivity through the RJ-45 connector on the bottom panel.

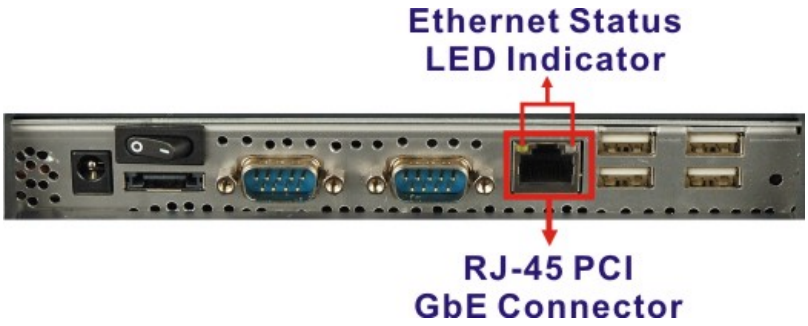



**Figure 2-6: RJ-45 Ethernet Connector**

The PCI lane from the VIA CX700M chipset of the ACT-08A-CX2 is interfaced to a Realtek RTL8110SC PCI gigabit Ethernet (GbE) controller. The RTL8110SC is then connected directly to the RJ-45 connector on the bottom panel and provides external GbE connectivity. Some of the RTL8110SC controller features are listed below:

- Integrated 10/100/1000 transceiver
- Supports PCI rev.2.3, 32-bit, 33/66MHz
- Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
- Supports IEEE 802.1P Layer 2 Priority Encoding
- Supports IEEE 802.1Q VLAN tagging
- Serial EEPROM
- 3.3/1.8/1.5V signaling, 5V PCI I/O tolerant
- 0.15µm CMOS process
- Transmit/Receive FIFO (8K/64K) support
- Supports PCI Message Signaled Interrupt (MSI)

### 2.5.3 External USB Connectors

The ACT-08A-CX2 has four USB 2.0 connectors. All of the USB 2.0 connectors are interfaced directly to the USB controllers on the VIA CX700M. The USB connectors are fully compliant with USB specification Revision 2.0 and USB specification Revision 1.1 and can be interfaced to both USB 1.1 and USB 2.0 compliant devices.

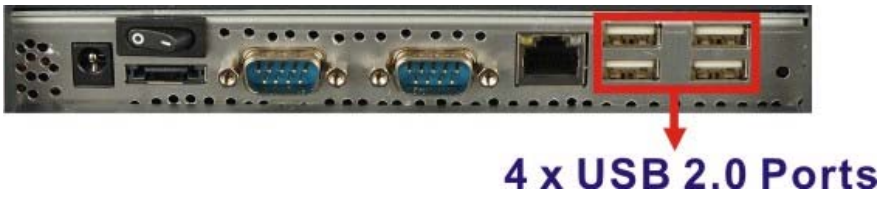



**Figure 2-7: External USB Ports**

### 2.5.4 External SATA Connector

An external SATA connector on the bottom panel interfaces to VIA CX700M chipset on the motherboard that connects through the serial ATA bus. The external SATA connector supports one external SATA drive.

**Figure 2-8: External SATA Connector**

## 2.6 System Power

### 2.6.1 Power Adapter

The system is shipped with a 90 V to 264 V IEI AC power adapter that has a maximum power output of 48 W. The power supply is shown in below.

### 2.6.2 Power Connectors

A standard power jack on the bottom panel of the ACT-08A-CX2 is connected to the power adapter and can input 12 V of direct current (DC) into the system. The power connector and power switch are shown in **Figure 2-9** below.

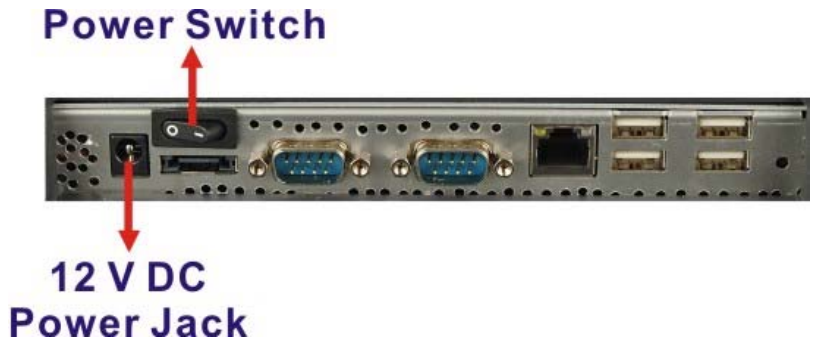



**Figure 2-9: Power Connector and Power Switch**

## 2.7 Wireless Connection

The following section describes the wireless modules on the circuit.

### 2.7.1 Wireless Ethernet

An integrated 802.11 b/g wireless LAN module and PIFA antenna on the ACT-08A-CX2 ensure an uninterrupted wireless connection. PIFA antennas can receive high-quality, uniform signals in any location from all directions without any signal degradation or impedance and are the most efficient antennas on the market.

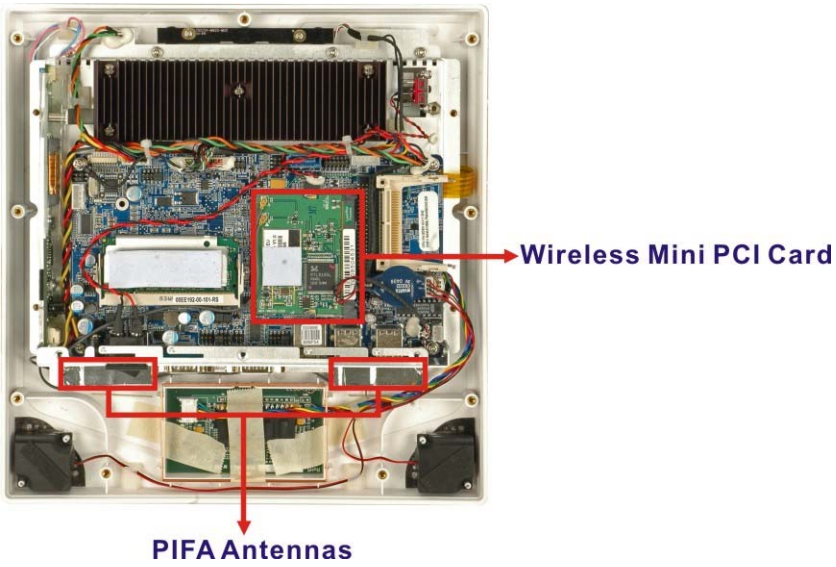



**Figure 2-10: Wireless LAN Mini PCI Card**

Chapter

3

# Unpacking

## 3.1 Unpacking

To unpack the access control terminal, follow the steps below:

**WARNING!**

The front side LCD screen has a protective plastic cover stuck to the screen. Only remove the plastic cover after the ACT-08A-CX2 has been properly installed. This ensures the screen is protected during the installation process.

**Step 1:** Use box cutters, a knife or a sharp pair of scissors that seals the top side of the external (second) box.

**Step 2:** Open the external (second) box.

**Step 3:** Use box cutters, a knife or a sharp pair of scissors that seals the top side of the internal (first) box.

**Step 4:** Lift the monitor out of the boxes.

**Step 5:** Remove both polystyrene ends, one from each side.

**Step 6:** Pull the plastic cover off the ACT-08A-CX2.

**Step 7:** Make sure all the components listed in the packing list are present.

### 3.1.1 Packing List

The ACT-08A-CX2 access control terminal is shipped with the following components:

| Quantity | Item | Image |
|---|---|---|
| 1 | ACT-08A-CX2 access control terminal | |
| 1 | Screw set | |
| 1 | Power adapter | |
| 1 | Touch pen | |
| 1 | User manual CD and driver CD | |
| 1 | External SATA cable | |

If any of these items are missing or damaged, contact the distributor or sales representative immediately.

Chapter

4

# Installation

## 4.1 Anti-static Precautions

**WARNING:**

Failure to take ESD precautions during the maintenance of the ACT-08A-CX2 may result in permanent damage to the ACT-08A-CX2 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the ACT-08A-CX2. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the ACT-08A-CX2 is accessed internally, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***: - Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: - When configuring the ACT-08A-CX2, place it on an antic-static pad. This reduces the possibility of ESD damaging the ACT-08A-CX2.
- ***Only handle the edges of the PCB***: - When handling the PCB, hold the PCB by the edges.

## 4.2 Installation Precautions

When installing the POS system, please follow the precautions listed below:

- **Power turned off**: When installing the system, make sure the power is off. Failing to turn off the power may cause severe injury to the body and/or damage to the system.
- **Certified Engineers**: Only certified engineers should install and modify onboard functionalities.
- **Anti-static Discharge**: If a user open the rear panel of the system, to

configure the jumpers or plug in added peripheral devices, ground themselves first and wear and anti-static wristband.

## 4.3 Preinstalled Components

The following components are all preinstalled.

- Motherboard
- TFT LCD screen
- DDR2 memory module
- Resistive type touch screen
- RFID module
- Wireless LAN module
- Bluetooth module

Preinstalled OEM customizations may include the following.

- Different DDR2 memory module
- CF card

Component installation is described in **the following sections.**

## 4.4 Installation and Configuration Steps

The following installation steps must be followed.

**Step 1:** Unpack the ACT-08A-CX2

**Step 2:** Install CF card

**Step 3:** Configure the system

**Step 4:** Mount the ACT-08A-CX2

**Step 5:** Connect peripheral devices to the bottom panel of the ACT-08A-CX2.

## 4.5 Rear Panel Removal

To access the CF slot and AT/ATX switch, the back cover must be removed. To remove the back cover, please follow the steps below.

**Step 1:** Put the front panel of the ACT-08A-CX2 on a table.

**Step 2:** **Remove the rear panel**. Remove the nine retention screws (**Figure 4-1**) from the rear panel and lift the back cover off the ACT-08A-CX2.

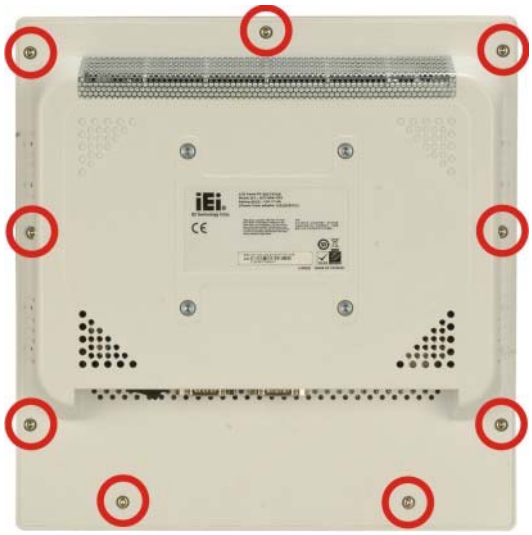


**Figure 4-1: Rear Panel Retention Screws**

## 4.6 CF Card Installation

The ACT-08A-CX2 has one CF Type II slot. To install the CF card, follow the instructions below.

**Step 1:** **Remove the rear panel**. Refer to **Section 4.5**.

**Step 2:** **Locate the CF socket**. The CF socket is located inside the left side panel of the ACT-08A-CX2. See **Figure 4-2**

**Figure 4-2: CF Socket Location**

**Step 3:** **Install the CF Card**. Correctly align the CF card with the socket and insert the CF card into the socket. See **Figure 4-3**.

**Figure 4-3: CF Card Installation**

**Step 4:** **Replace the rear panel**. Make sure the rear panel is properly secured with the previously removed retention screws.

## 4.7 Jumper Settings

**NOTE:**

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.

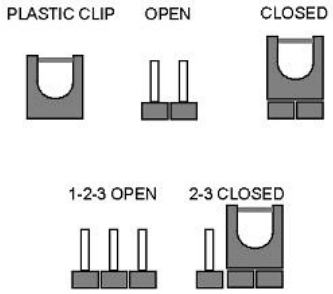



**Figure 4-4: Jumper Locations**

The following jumpers can be found on the motherboard installed in the ACT-08A-CX2. Before the ACT-08A-CX2 is installed, the jumpers must be set in accordance with the desired configuration. The jumpers on the ACT-08A-CX2 motherboard are listed in **Table 4-1**.

| Description | Label | Type |
|---|---|---|
| COM port pin-9 setting | JP6 | 10-pin header |
| COM2 function selection | JP7, JP15, JP17 | 3-pin header |

**Table 4-1: Jumpers**

### 4.7.1 Access the Jumpers

To access the jumpers, the rear panel and the aluminum cover must be removed. To remove the rear panel and the aluminum cover, please follow the steps below.

**Step 1:** Put the front panel of the ACT-08A-CX2 on a table.

**Step 2:** **Remove the rear panel**. Remove the nine retention screws (**Figure 4-1**) from the rear panel and lift the rear panel off the ACT-08A-CX2.

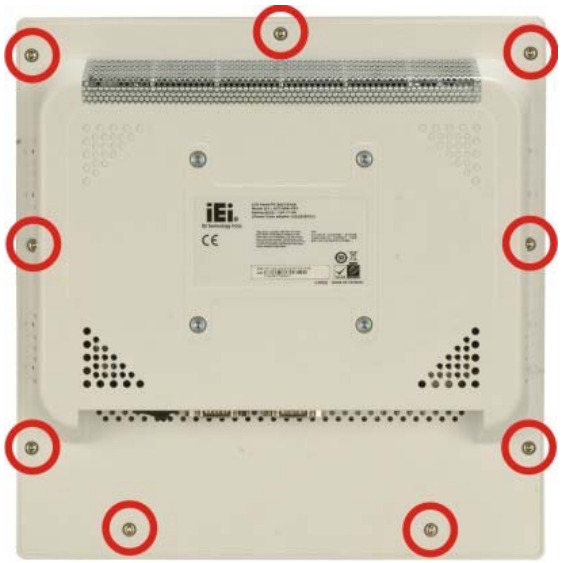


**Figure 4-5: Rear Panel Retention Screws**

**Step 3:** **Remove the aluminum cover**. The system motherboard is installed inside the aluminum chassis. Remove the nine retention screws from the aluminum chassis and lift the aluminum cover off the ACT-08A-CX2.

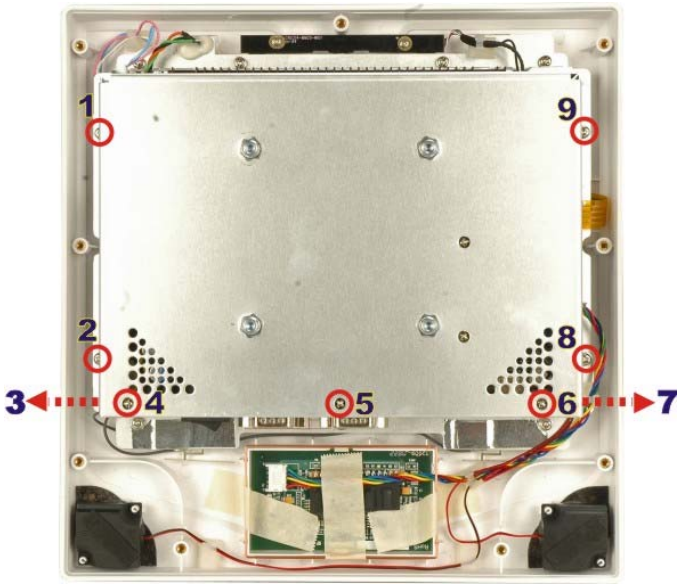



**Figure 4-6: Aluminum Chassis Cover Retention Screws**

### 4.7.2 Preconfigured Jumpers

**WARNING:**

Do not change the settings on the jumpers in described here. Doing so may disable or damage the system

The following jumpers are preconfigured for the ACT-08A-CX2. Users should **NOT** change these jumpers.

| Jumper Name | Label | Type |
|---|---|---|
| LVDS voltage selection | JP4 | 3-pin header |
| Panel type and resolution | JP2 | 10-pin header |
| Touch panel type selection | J1 | 4-pin header |

**Table 4-2: Preconfigured Jumpers**

### 4.7.3 COM1 and COM2 Pin 9 Select

**Jumper Label:** **JP6**

**Jumper Type:** 10-pin header

**Jumper Settings:** See **Table 4-3**

**Jumper Location:** See **Figure 4-7**

JP6 configures pin-9 on COM1 and COM2 DB-9 connectors. Pin 9 on the COM1 and the COM2 DB-9 connectors can be set as either +5 V, +12 V or as the ring (RI) signal. The COM1 and COM2 Pin 9 Setting jumper selection options are shown in **Table 4-3**.

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 1 | +12V | 2 | +12V |
| 3 | COMRI1 | 4 | COMRI2 |
| 5 | +5V | 6 | +5V |

| | | | |
|---|---|---|---|
| 7 | COMRI1 | 8 | COMRI2 |
| 9 | RI1 | 10 | RI2 |

**Table 4-3: COM1 and COM2 Pin 9 Setting Jumper Settings**

The COM1 and COM2 Pin 9 Setting jumper location are shown in **Figure 4-7** below.

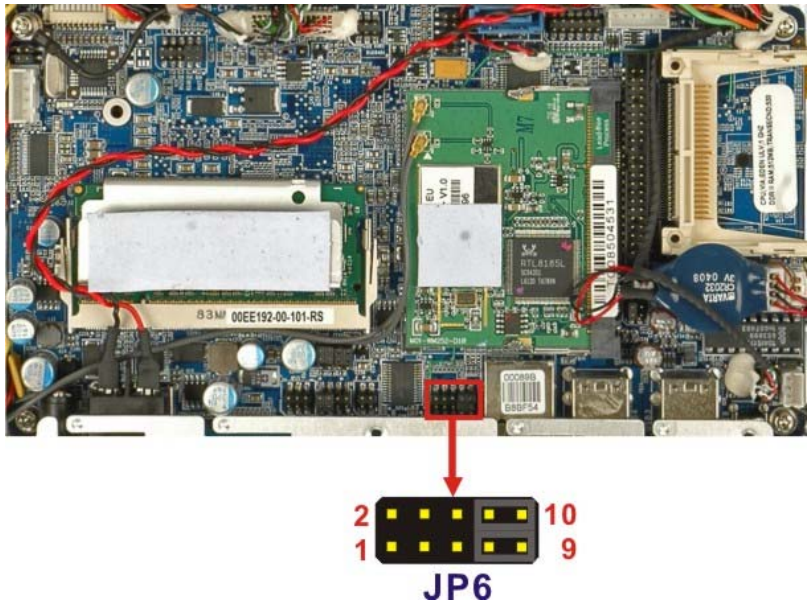



**Figure 4-7: COM1 and COM2 Pin 9 Setting Jumper Locations**

### 4.7.4 COM 2 Function Select Jumper

**Jumper Label:** **JP7**, **JP15** and **JP17**

**Jumper Type:** Pin header

**Jumper Settings:** See **Table 4-4**, Table 4-5 and Table 4-6

**Jumper Location:** See **Figure 4-8**

The COM 2 Function Select jumper sets the communication protocol used by the second serial communications port (COM 2) as RS-232, RS-422 or RS-485. The COM 2 Function Select settings are shown in **Table 4-4**, Table 4-5 and Table 4-6.

| JP7 | Description | |
|---|---|---|
| Short 1-2 | BIOS RS-232/422 | Default |
| Open 1-2 | BIOS RS-485 | |
| Short 3-4 | RS-232 | Default |
| Short 4-5 | RS-422 | |
| Short 7-8 | RS-485 | |

**Table 4-4: COM 2 Function Select Jumper Settings (JP7)**

| JP15 | Description |
|---|---|
| Short 1-2, 3-4 | RS-422 |
| Short 3-4, 5-6 | RS-485 |

**Table 4-5: COM 2 Function Select Jumper Settings (JP15)**

| JP17 | Description | |
|---|---|---|
| Short 1-2 | DCD2 (RS-232) | Default |
| Short 2-3 | TX2- (RS-422/485) | |
| Short 4-5 | RXD2 (RS-232) | Default |
| Short 5-6 | TX+ (RS-422/485) | |
| Short 7-8 | DSR2 (RS-232) | Default |
| Short 8-9 | RX- (RS-422/485) | |
| Short 10-11 | RTS2 (RS-232) | Default |
| Short 11-12 | RX+ (RS-422/485) | |

**Table 4-6: COM 2 Function Select Jumper Settings (JP17)**

The COM 2 Function Select jumper locations are shown in **Figure 4-8**.

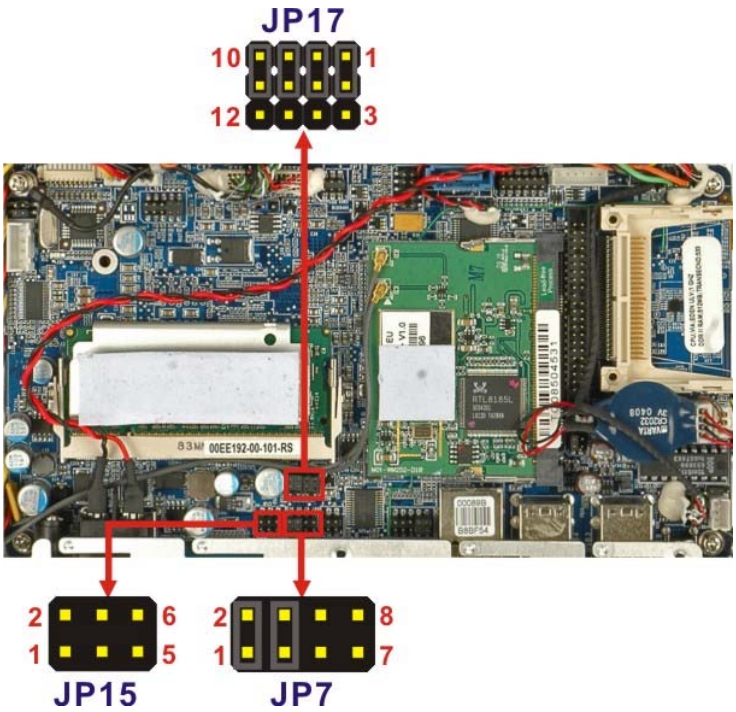



**Figure 4-8: COM 2 Function Select Jumper Locations**

### 4.7.4.1 RS-422 and RS-485 Pinouts

The pinouts for RS-422 and RS-485 operation of external serial port COM 2 are detailed below.

| Pin | RS-422 Description |
|---|---|
| 1 | Tx- |
| 2 | Tx+ |
| 6 | Rx- |
| 7 | Rx+ |

**Table 4-7: RS-422 Pinouts**

| Pin | RS-485 Description |
|---|---|
| 1 | Data- |
| 2 | Data+ |

**Table 4-8: RS-485 Pinouts**

### 4.7.5 AT/ATX Mode Selection

AT and ATX power modes can both be used on the ACT-08A-CX2. The selection is made through an AT/ATX switch inside the left panel (**Figure 4-9**). To select AT mode or ATX mode, follow the steps below.

**Step 1:** Remove the rear panel. Refer to **Section 4.5**.

**Step 2:** Locate the AT/ATX switch on the bottom panel (**Figure 4-9**).

**Figure 4-9: AT/ATX Switch**

**Step 3:** Adjust the AT/ATX switch. The default mode is ATX mode. (**Figure 4-9**)

## 4.8 Mounting the System

### 4.8.1 Wall Mounting (Optional)

To mount the ACT-08A-CX2 onto the wall, please follow the steps below.

**Step 1:** Select the location on the wall for the wall-mounting bracket.

**Step 2:** Carefully mark the locations of the four screw holes in the bracket on the wall.

**Step 3:** Drill four pilot holes at the marked locations on the wall for the bracket retention screws.

**Step 4:** Align the wall-mounting bracket screw holes with the pilot holes.

**Step 5:** Secure the mounting-bracket to the wall by inserting the retention screws into the four pilot holes and tightening them (**Figure 4-10**).

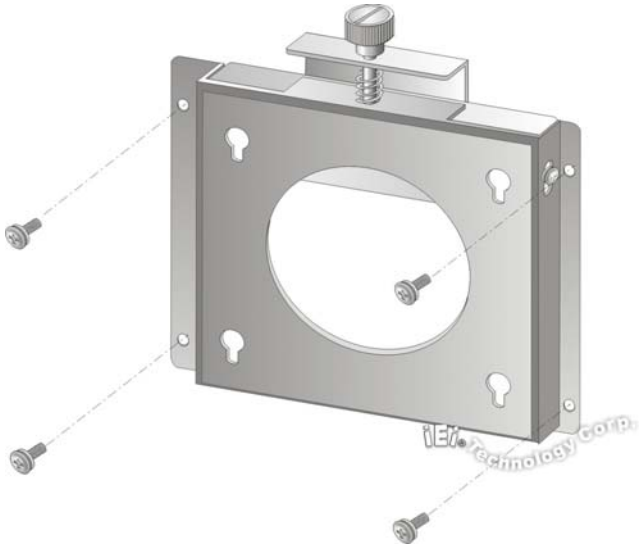


**Figure 4-10: Wall-mounting Bracket**

**Step 6:** Insert the four monitor mounting screws provided in the wall mounting kit into the four screw holes on the real panel of the ACT-08A-CX2 and tighten until the screw shank is secured against the rear panel (**Figure 4-11**).

**Step 7:** Align the mounting screws on the rear panel with the mounting holes on the bracket.

**Step 8:** Carefully insert the screws through the holes and gently pull the monitor downwards until the ACT-08A-CX2 rests securely in the slotted holes (**Figure 4-11**). Ensure that all four of the mounting screws fit snuggly into their respective slotted holes.

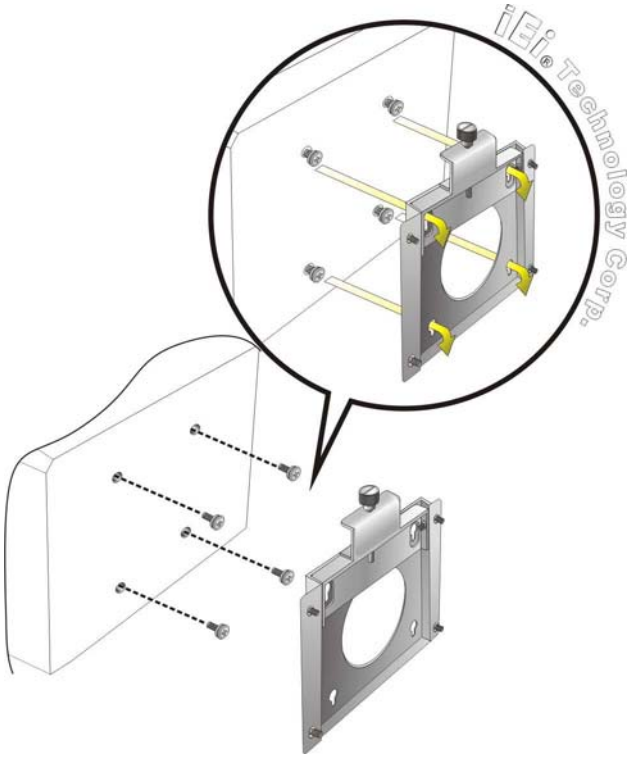


**Figure 4-11: Chassis Support Screws**

**NOTE:**

In the diagram below the bracket is already installed on the wall.

**Step 9:** Secure the ACT-08A-CX2 by fastening the retention screw of the wall-mounting bracket. (**Figure 4-12**).

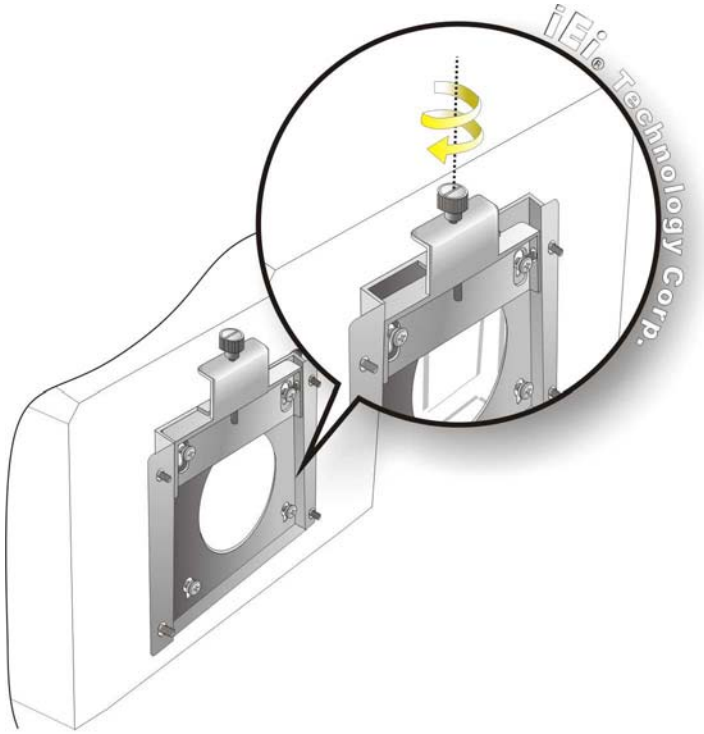



**Figure 4-12: Secure the ACT-08A-CX2**

### 4.8.2 Panel Mounting

To mount the ACT-08A-CX2 into a panel, please follow the steps below.

**Step 1:** Select the position on the panel to mount the ACT-08A-CX2.

**Step 2:** Cut out a section from the panel that corresponds to the rear panel dimensions of the ACT-08A-CX2. Take care that the panel section that is cut out is smaller than the overall size of the frame that surrounds the flat panel PC but just large enough for the rear panel of the flat panel PC to fit through (see **Figure 4-13**).

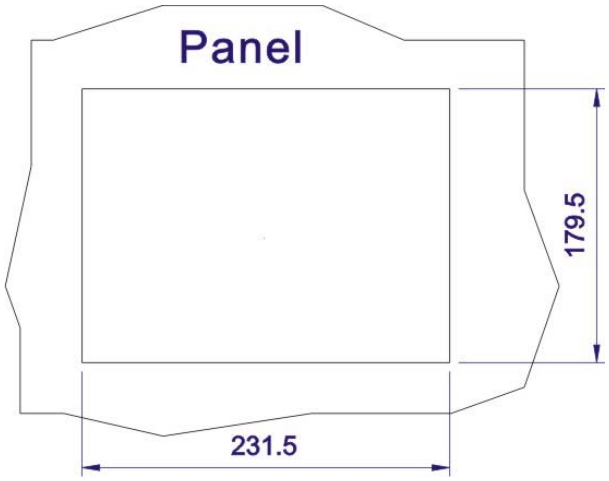



**Figure 4-13: ACT-08A-CX2 Panel Opening (mm)**

**Step 3:** Slide the flat panel PC through the hole until the frame is flush against the panel.

**Step 4:** Insert the panel mounting clamps into the pre-formed holes along the edges of the chassis, behind the frame.

**Step 5:** Tighten the screws that pass through the panel mounting clamps until the plastic caps at the front of all the screws are firmly secured to the panel (**Figure 4-14**).

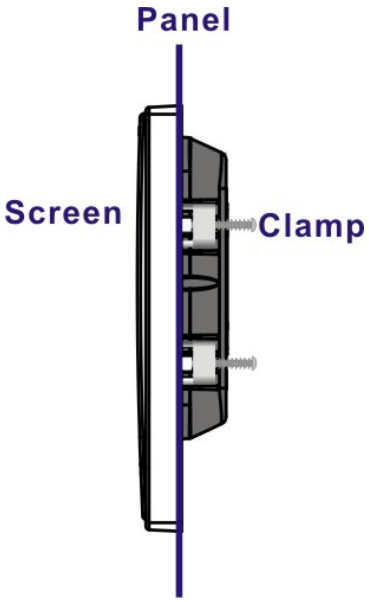



**Figure 4-14: Tighten the Panel Mounting Clamp Screws**

### 4.8.3 Arm Mounting

The ACT-08A-CX2 is VESA (Video Electronics Standards Association) compliant and can be mounted on an arm with a 75 mm interface pad. To mount the ACT-08A-CX2 on an arm, please follow the steps below.

**Step 1:** The arm is a separately purchased item. Please correctly mount the arm onto the surface it uses as a base. To do this, refer to the installation documentation that came with the mounting arm.

**NOTE:**

When purchasing the arm please ensure that it is VESA compliant and that the arm has a 75 mm interface pad. If the mounting arm is not VESA compliant it cannot be used to support the ACT-08A-CX2.

**Step 2:** Once the mounting arm has been firmly attached to the surface, lift the flat panel PC onto the interface pad of the mounting arm.

**Step 3:** Align the retention screw holes on the mounting arm interface with those in the flat panel PC. The ACT-08A-CX2 arm mount retention screw holes are shown in **Figure 4-15**.

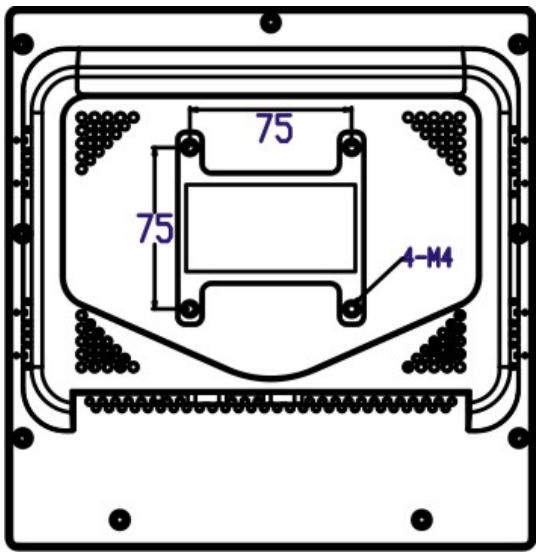



**Figure 4-15: ACT-08A-CX2 Arm Mounting Retention Screw Holes**

**Step 4:** Secure the flat panel PC to the interface pad by inserting four retention screws through the bottom of the mounting arm interface pad and into the flat panel PC.

### 4.8.4 Cabinet and Rack Installation

The ACT-08A-CX2 can be installed into a cabinet or rack. The installation procedures are similar to the panel mounting installation. To do this, please follow the steps below:

**NOTE:**

When purchasing the cabinet/rack installation bracket, make sure it is compatible with both the ACT-08A-CX2 flat panel PC and the rack/cabinet into which the ACT-08A-CX2 is installed.

**Step 1:** Slide the rear chassis of the ACT-08A-CX2 through the rack/cabinet bracket until the frame is flush against the front of the bracket (**Figure 4-16**).

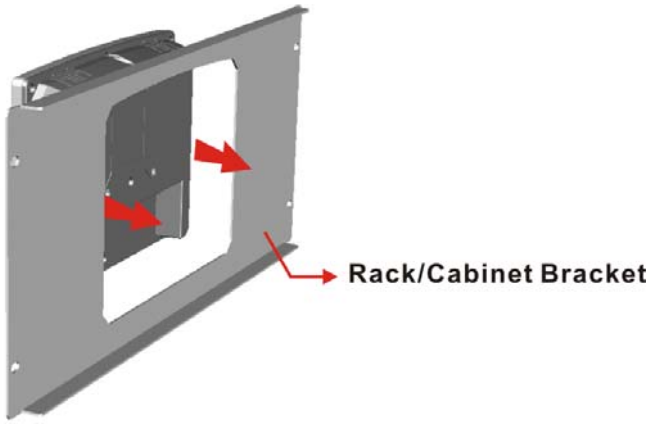



**Figure 4-16: The Rack/Cabinet Bracket**

**Step 2:** Insert the rack mounting clamps into the pre-formed holes along the edges of the flat panel PC, behind the ABS/PC plastic frame.

**Step 3:** Tighten the screws that pass through the rack mounting clamps until the plastic caps at the front of all the screws are firmly secured to the bracket (**Figure 4-17**).

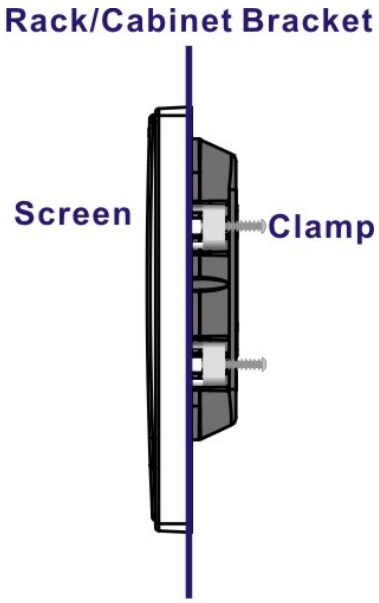



**Figure 4-17: Secure the Rack/Cabinet Bracket**

**Step 4:** Slide the flat panel PC with the attached rack/cabinet bracket into a rack or cabinet (**Figure 4-18**).

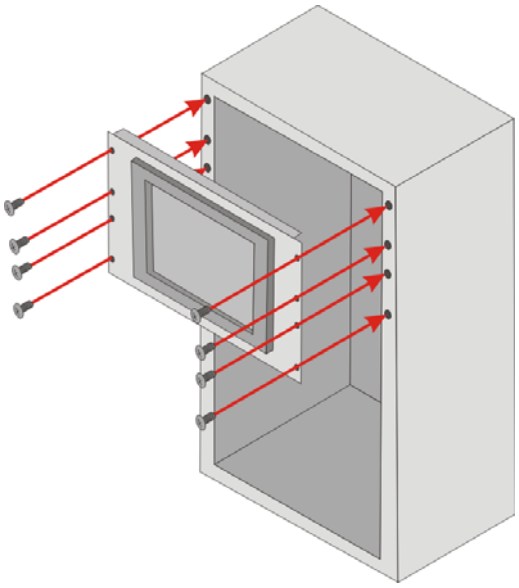


**Figure 4-18: Install into a Rack/Cabinet**

**Step 5:** Once the flat panel PC with the attached rack/cabinet bracket has been properly inserted into the rack or cabinet, secure the front of the rack/cabinet bracket to the front of the rack or cabinet (**Figure 4-18**).

## 4.9 Bottom Panel Connectors

### 4.9.1 LAN Connection

There is one external RJ-45 LAN connector. The RJ-45 connector enables connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

**Step 1:** **Locate the RJ-45 connectors** on the bottom panel of the ACT-08A-CX2.

**Step 2:** **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the bottom panel of the ACT-08A-CX2. See **Figure 4-19**.

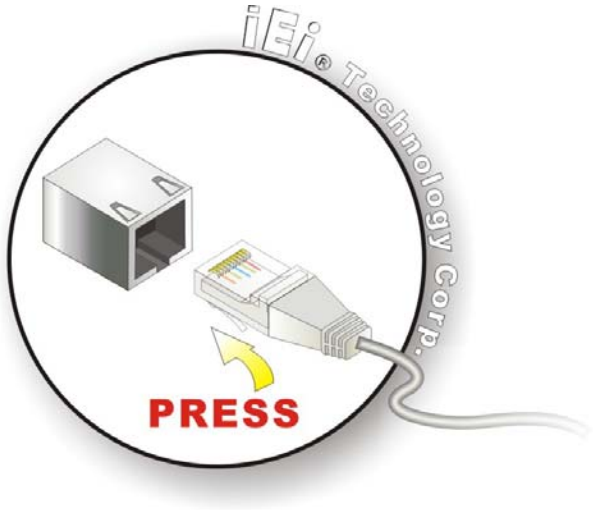



**Figure 4-19: LAN Connection**

**Step 3:** **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the onboard RJ-45 connector.

### 4.9.2 Serial Device Connection

The ACT-08A-CX2 has two male DB-9 connectors on the bottom panel for serial devices to be connected. Follow the steps below to connect a serial device to the ACT-08A-CX2 POS system.

**Step 1:** **Locate the DB-9 connector**. The location of the DB-9 connector is shown in **Chapter 2**.

**Step 2:** **Insert the serial connector**. Insert the DB-9 connector of a serial device into the DB-9 connector on the bottom panel. See **Figure 4-20**.

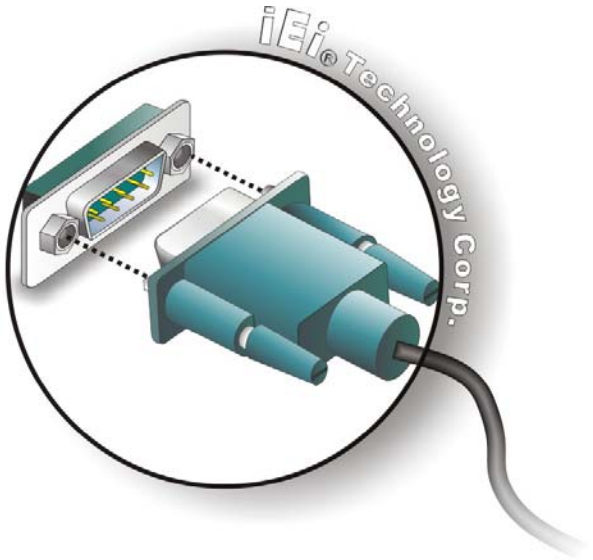


**Figure 4-20: Serial Device Connector**

**Step 3:** **Secure the connector**. Secure the serial device connector to the external interface by tightening the two retention screws on either side of the connector.

### 4.9.3 USB Device Connection

There are four external USB 2.0 connectors. All connectors are perpendicular to the ACT-08A-CX2. To connect a USB 2.0 or USB 1.1 device, please follow the instructions below.

**Step 1:** **Located the USB connectors**. The locations of the USB connectors are shown in **Chapter 2**.

**Step 2:** **Align the connectors.** Align the USB device connector with one of the connectors on the bottom panel. See **Figure 4-21**.

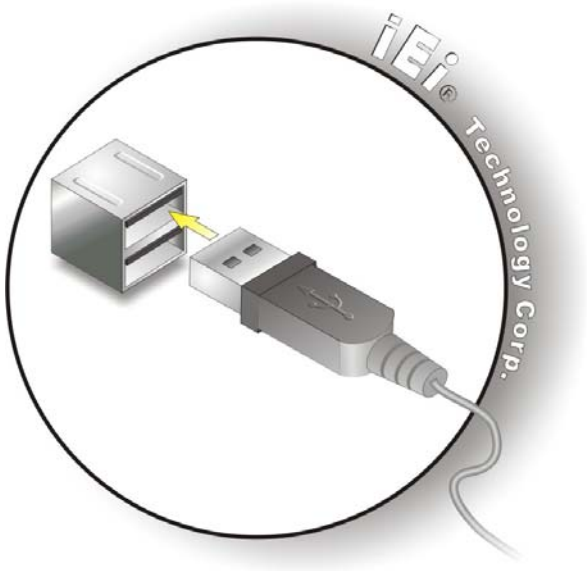


**Figure 4-21: USB Device Connection**

**Step 3:** **Insert the device connector.** Once aligned, gently insert the USB device connector into the onboard connector.

Chapter

5

# RFID Reader

## 5.1 Introduction

IEI provides a RFID tool (RF320) to configure Mifare cards and EM cards. The following sections describe how to install the RF320 and how to use RF320 to configure Mifare cards and EM cards.

## 5.2 Installation

The RF320 must be installed in the ACT-08A-CX2 from the utility CD in the package before using it to configure the RFID cards. To install the RF320, please follow the steps below. The following example is based on the Windows® XP environment.

**Step 1:** Run the **RF-320 setup V1.3.2.exe** file from the utility CD.

**Step 2:** The **InstallShield Wizard** is prepared to guide the user through the rest of the process. Once initialized, the **InstallShield Wizard** welcome screen appears (Figure 5-1).

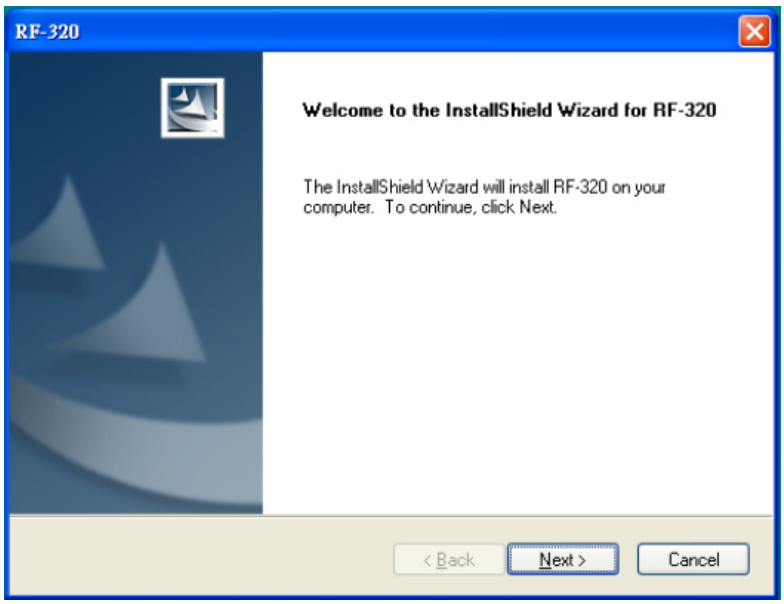

RF-320
Welcome to the InstallShield Wizard for RF-320
The InstallShield Wizard will install RF-320 on your computer. To continue, click Next.
< Back
Next >
Cancel

**Figure 5-1: InstallShield Wizard Welcome Screen**

**Step 3:** Click **NEXT** to continue the installation.

**Step 4:** The **Customer Information** screen shown in Figure 5-2. Enter a user name and

a company name. Click **NEXT** to continue the installation.

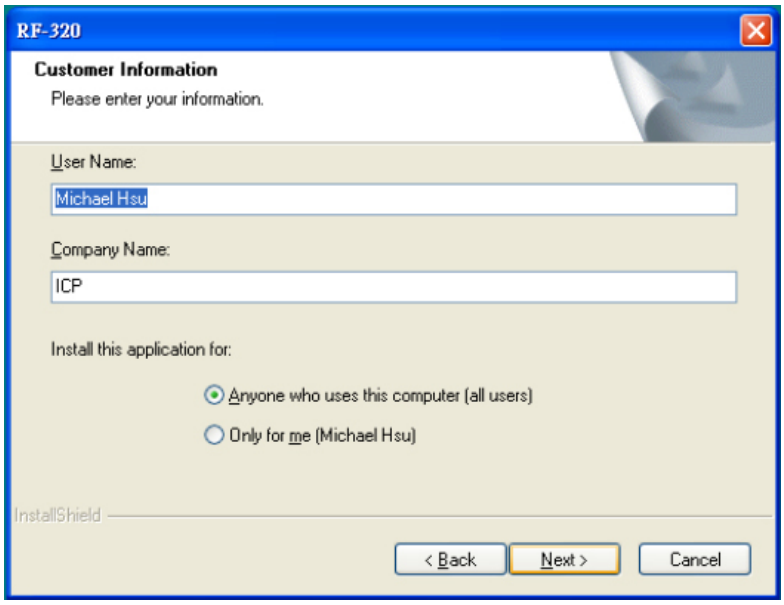



**Figure 5-2: Customer Information Screen**

**Step 5:** At this stage in Figure 5-3 appears. Please choose the setup type. Click **NEXT** to continue the installation.

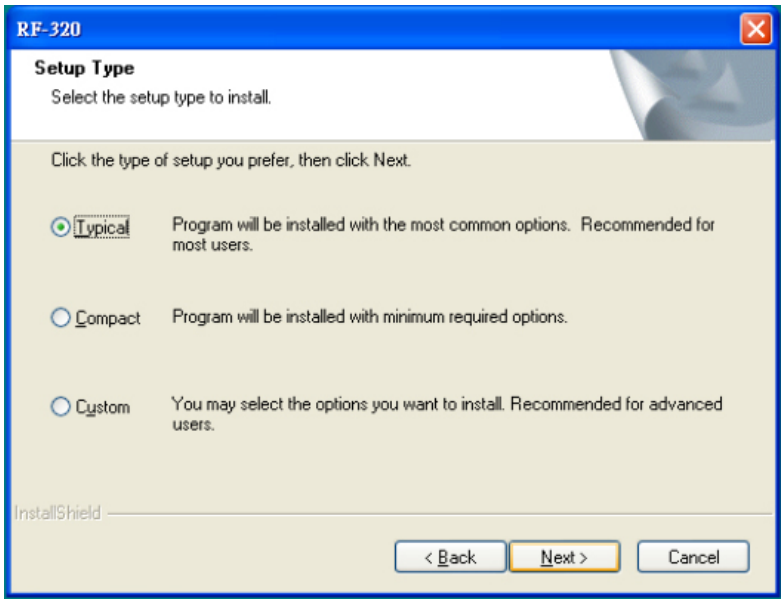

RF-320
Setup Type
Select the setup type to install.
Click the type of setup you prefer, then click Next.
Typical
Program will be installed with the most common options. Recommended for most users.
Compact
Program will be installed with minimum required options.
Custom
You may select the options you want to install. Recommended for advanced users.
InstallShield
< Back
Next >
Cancel

**Figure 5-3: Setup Type Selection Screen**

**Step 6:** The window shows the current settings for installing the RF320 (Figure 5-4).

Click **NEXT** to confirm the settings and continue the installation.

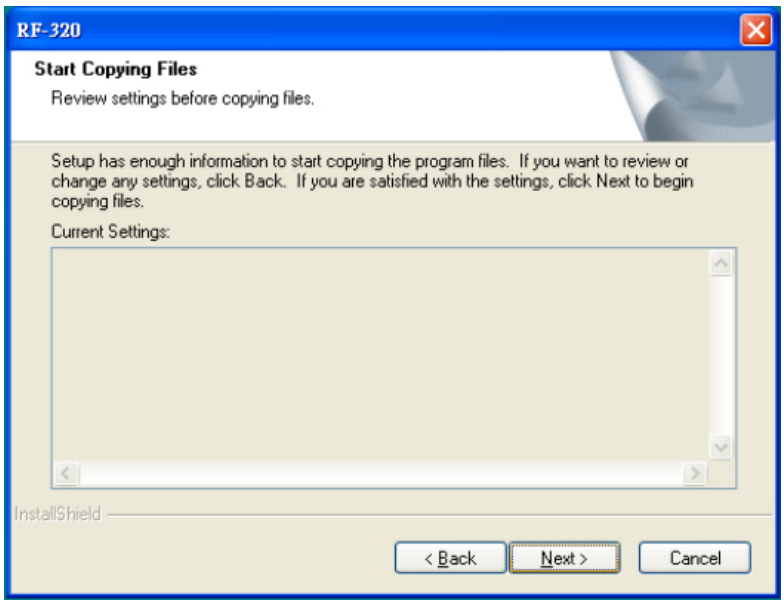
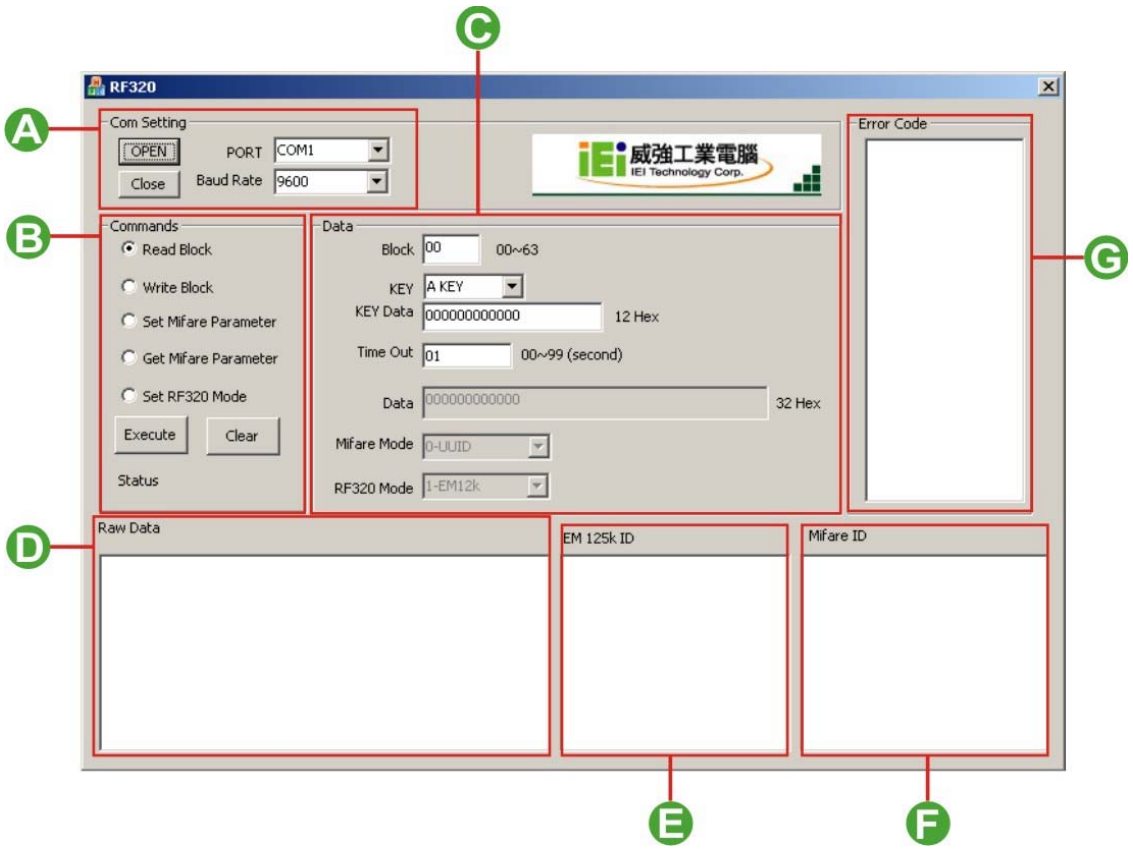

RF-320
Start Copying Files
Review settings before copying files.
Setup has enough information to start copying the program files. If you want to review or change any settings, click Back. If you are satisfied with the settings, click Next to begin copying files.
Current Settings:
InstallShield
< Back
Next >
Cancel

**Figure 5-4: Current Settings Confirmation Screen**

**Step 7:** Click **FINISH** to exit.

**Step 8:** To launch the RF320, click Start menu → Program File → IEI → RF320.

## 5.3 RF320 Interface Overview




**A - COM Port Settings and Activation Area**

Allows the user to select the serial port used by the ACT-08A-CX2 to communicate with the RFID reader module.

**B - Commands Area**

Shows various request options for user to select.

**C - Data Input Area**

The data input area is where the user enters block number, key, key data, and other information required by certain commands.

**D - Raw Data Display Area**

Shows all communication logs and responses of the executed commands.

**E - EM Card ID Display Area**

Displays the EM card ID when the EM card is detected.

**F - Mifare Card ID Display Area**

Displays the Mifare card ID when the Mifare card is detected.

**G Error Code Display Area**

Shows the error message when an error occurs.

## 5.4 Serial Port (COM) Settings

After launching the RF320 RFID tool, the COM port settings have to be set correctly to enable the communication with the built-in RFID reader. Please follow the information below to setup the COM port settings.

| Model | COM Port | Baud Rate |
|---|---|---|
| **ACT-08A-CX2** | COM 4 | 19200 |

**Table 5-1: RF320 COM Port Settings**

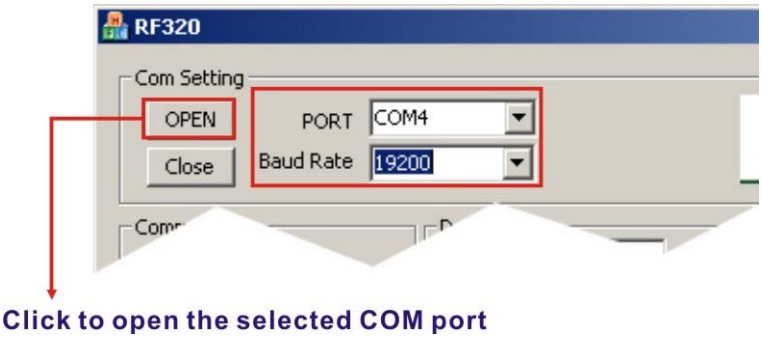
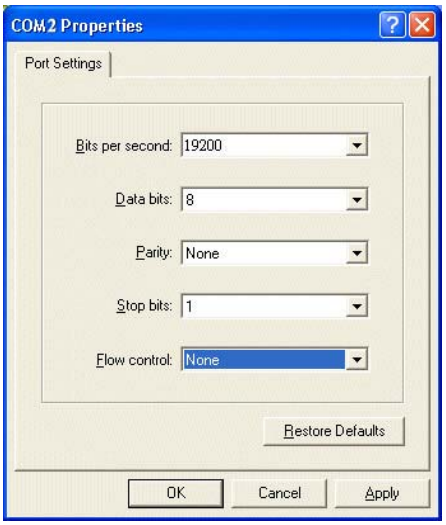



**Figure 5-5: RF320 COM Port Settings**

**NOTE:**

If the Hyper Terminal is used for communication, please setup the port properties as shown below.




**Bits per second**: 19200

**Data bits**: 8

**Parity**: None

**Stop bits**: 1

**Flow control**: None

## 5.5 RF320 Commands

The RF320 provides five commands, including:

- **Read Block**: read the block data from the Mifare/EM card
- **Write Block**: write the block data into the Mifare/EM card
- **Set Mifare Parameter**:
- **Get Mifare Parameter**:
- **Set RF320 Mode**:

The following sections describe how to use these commands.

### 5.5.1 Read Block

To read the block data from a Mifare card, please follow the steps below.

**Step 1:** Select **Read Block** in the command area (Figure 5-6).

**Step 2:** Configure the data, including block, key, key data and time out (Figure 5-6).

**Step 3:** Click the **Execute** button to execute the command through the selected serial port (Figure 5-6). The raw data of this command shows in the Raw Data area in the format listed in Table 5-2 and Table 5-3.

**Figure 5-6: Read Block**

| Field | Command | Block | KEY | KEY Data | Time Out | End |
|---|---|---|---|---|---|---|
| Digit | 2 | 2 | 1 | 12 | 2 | 1 |
| Data | RB | 00~63 | A/B | 000000000000 ~ FFFFFFFFFFFF (Hex) | 00~99 (Second) | CR (0x0d) |

**Table 5-2: Read Block Raw Data Format**

| Status (2 digits) | Block Data (32 digits) | END (2 digits) |
|---|---|---|
| OK | 32 bits (Hex) | CR,LF (0x0d,0x0a) |
| ER | Error Code (3 digits) | CR,LF (0x0d,0x0a) |

**Table 5-3: Read Block Response Format**

### 5.5.2 Write Block

To write the block data into a Mifare card, please follow the steps below.

**Step 1:** Select **Write Block** in the command area (Figure 5-7).

**Step 2:** Configure the data, including block, key, key data, time out and data (Figure 5-7).

**Step 3:** Click the **Execute** button to execute the command through the selected serial port (Figure 5-7). The raw data of this command shows in the Raw Data area in the format listed in Table 5-4 and Table 5-5.

**Figure 5-7: Write Block**

| Field | Command | Block | KEY | KEY Data | Time Out | Block Data | End |
|---|---|---|---|---|---|---|---|
| Digit | 2 | 2 | 1 | 12 | 2 | 32 | 1 |
| Data | WB | 00~63 | A/B | 000000000000 ｛ (Hex) FFFFFFFFFFFF | 00~99 (Second) | 32 digits Hex | CR (0x0d) |

**Table 5-4: Write Block Raw Data Format**

| Status (2 digits) | Block Data | END (2 digits) |
|---|---|---|
| OK | Null | CR,LF (0x0d,0x0a) |
| ER | Error Code (3 digits) | CR,LF (0x0d,0x0a) |

**Table 5-5: Write Block Response Format**

### 5.5.3 Set Mifare Parameter

To set parameter of a Mifare card reader, please follow the steps below.

**Step 1:** Select **Set Mifare Parameter** in the command area (Figure 5-8).

**Step 2:** Select a Mifare mode.

- 0-UUID: read serial number only.
- 1-UUID & KEY A: read serial number and use "KEY A" to read "Block' data".
- 2-UUID & KEY B: read serial number and use "KEY B" to read "Block data".

**Step 3:** Configure the block number, and key data (Figure 5-8).

**Step 4:** Click the **Execute** button to execute the command through the selected serial port (Figure 5-8). The raw data of this command shows in the Raw Data area in the format listed in Table 5-6 and Table 5-7.

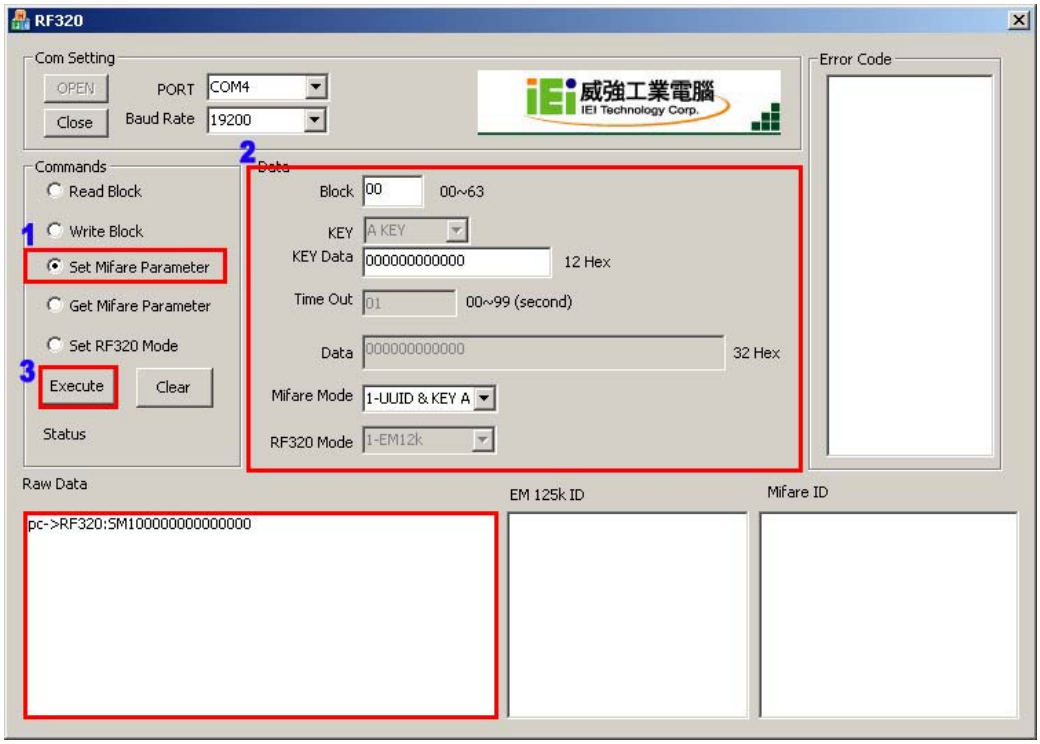



**Figure 5-8: Set Mifare Parameter**

| Field | Command | Access Mode | Block | KEY Data | End |
|---|---|---|---|---|---|
| Digit | 2 | 1 | 2 | 12 | 1 |
| Data | SM | 0~2 | 00~63 | 000000000000 ~ (Hex) FFFFFFFFFFFF | CR (0x0d) |

**Table 5-6: Set Mifare Parameter Raw Data Format**

| Status (2 digits) | Block Data | END (2 digits) |
|---|---|---|
| OK | Null | CR,LF (0x0d,0x0a) |
| ER | Error Code (3 digits) | CR,LF (0x0d,0x0a) |

**Table 5-7: Set Mifare Parameter Response Format**

### 5.5.4 Get Mifare Parameter

To read the parameter of a Mifare card reader, please follow the steps below.

**Step 1:** Select **Get Mifare Parameter** in the command area (Figure 5-9).

**Step 2:** Click the **Execute** button to execute the command through the selected serial port (Figure 5-9). The raw data of this command shows in the Raw Data area in the format listed in Table 5-8 and Table 5-9.

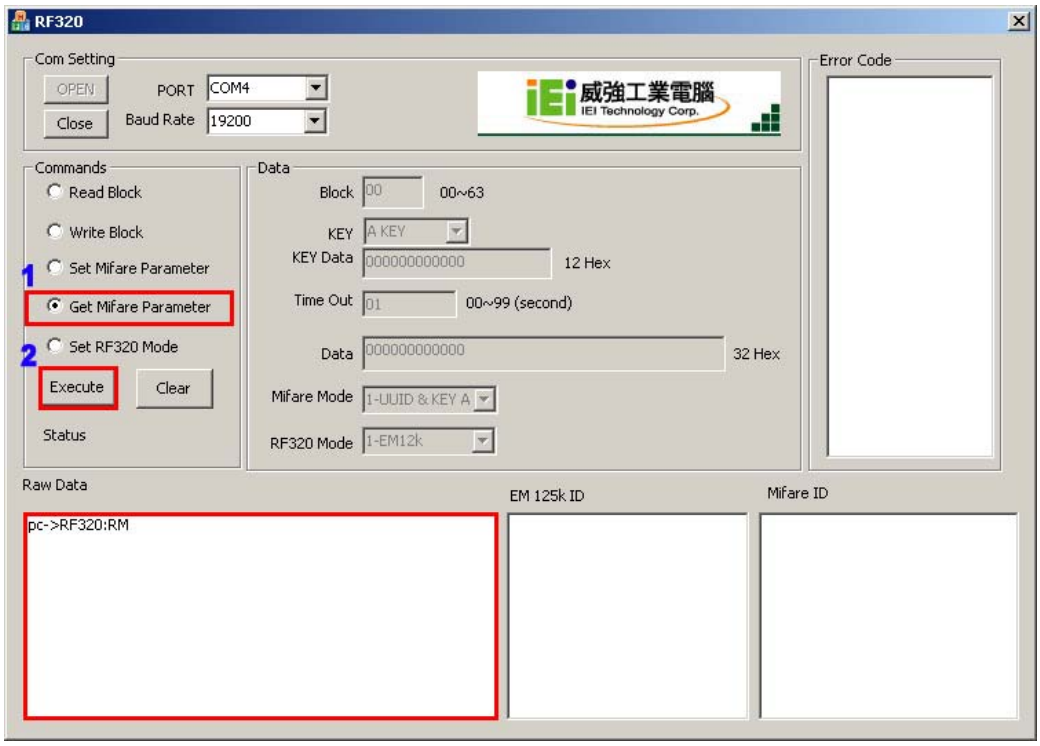



**Figure 5-9: Get Mifare Parameter**

| Field | Command | End |
|---|---|---|
| Digit | 2 | 1 |
| Data | RM | CR (0x0d) |

**Table 5-8: Get Mifare Parameter Raw Data Format**

| Status (2 digits) | Block Data | END (2 digits) |
|---|---|---|
| OK | Access mode (1 digit) + Block (2 digits) + Mode (1 digit) | CR,LF (0x0d,0x0a) |
| ER | Error Code (3 digits) | CR,LF (0x0d,0x0a) |

**Table 5-9: Get Mifare Parameter Response Format**

### 5.5.5 Set RF320 Mode

The Set RF320 Mode command is to set the type of RFID card for the RFID reader to detect. To set the type of RFID card, please follow the steps below.

**Step 1:** Select **Set RF320 Mode** in the command area (Figure 5-10).

**Step 2:** Select a RF320 mode.

- 1-EM12K: detect EM cards only.
- 2-Mifare: detect Mifare cards only.
- 3-EM and Mifare: detect both EM and Mifare cards.

**Step 3:** Click the **Execute** button to execute the command through the selected serial port (Figure 5-10). The raw data of this command shows in the Raw Data area in the format listed in Table 5-10 and Table 5-11.

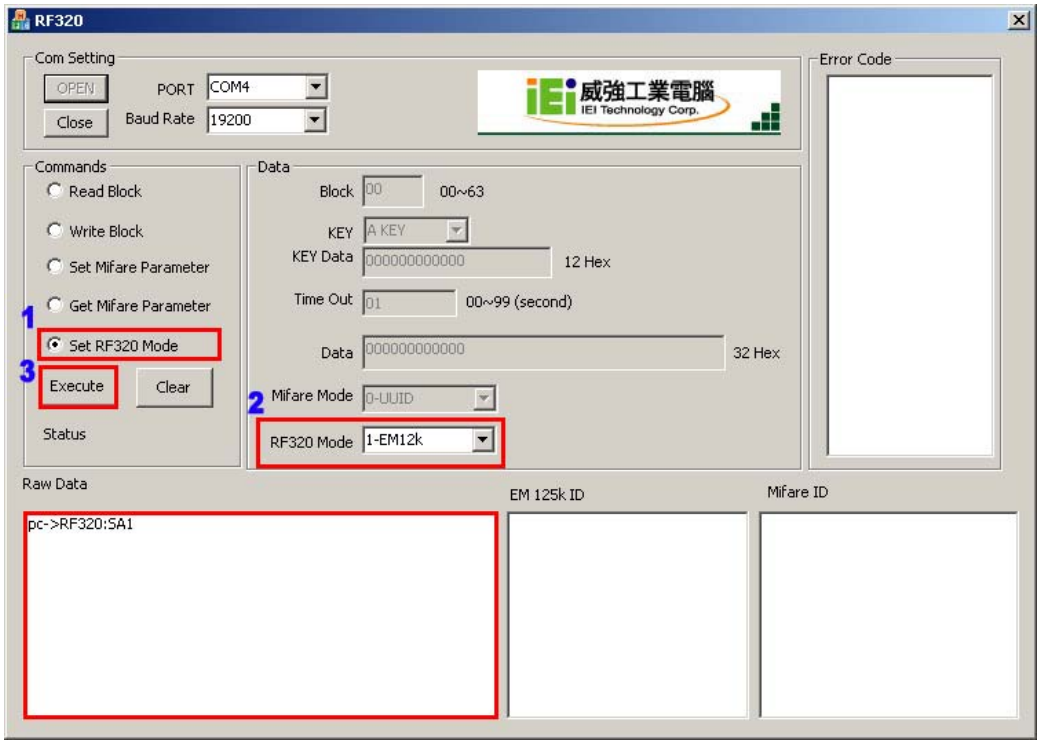



**Figure 5-10: Set RF-320 Mode**

| Field | Command | Mode | End |
|---|---|---|---|
| Digit | 2 | 1 | 1 |
| Data | SA | 1~3 | CR (0x0d) |

**Table 5-10: Set RF320 Mode Raw Data Format**

| Status (2 digits) | Block Data | END (2 digits) |
|---|---|---|
| OK | Null | CR,LF (0x0d,0x0a) |
| ER | Error Code (3 digits) | CR,LF (0x0d,0x0a) |

**Table 5-11: Set RF320 Mode Response Format**

Chapter

6

# System Maintenance

## 6.1 System Maintenance Introduction

If the components of the ACT-08A-CX2 fail they must be replaced. Components that can be replaced include:

- CF Module
- Wireless LAN module
- SO-DIMM module

Please contact the system reseller or vendor to purchase the replacement parts. Back cover removal instructions and component replacement for the ACT-08A-CX2 are described below.

## 6.2 Anti-static Precautions

**WARNING:**

Failure to take ESD precautions during the maintenance of the ACT-08A-CX2 may result in permanent damage to the ACT-08A-CX2 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the ACT-08A-CX2. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the ACT-08A-CX2 is accessed internally, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the ACT-08A-CX2, place it on an antic-static pad. This reduces the possibility of ESD damaging the ACT-08A-CX2.

- ***Only handle the edges of the PCB***:- When handling the PCB, hold the PCB by the edges.

## 6.3 Turn off the Power

**WARNING:**

Failing to turn off the system before opening it can cause permanent damage to the system and serious or fatal injury to the user.

Before any maintenance procedures are carried out on the system, make sure the system is turned off.

## 6.4 Removing the Rear Panel

To access the ACT-08A-CX2 internally, the rear panel must be removed. To remove the rear panel, please follow the steps below.

**Step 1:** **Follow all anti-static procedures**. See **Section 6.2**.

**Step 2:** **Turn off the power**. See **Section 6.3**.

**Step 3:** Put the front panel of the ACT-08A-CX2 on a table.

**Step 4:** **Remove the rear panel**. Remove the nine retention screws (Figure 6-1) from the rear panel and lift the rear panel off the ACT-08A-CX2.

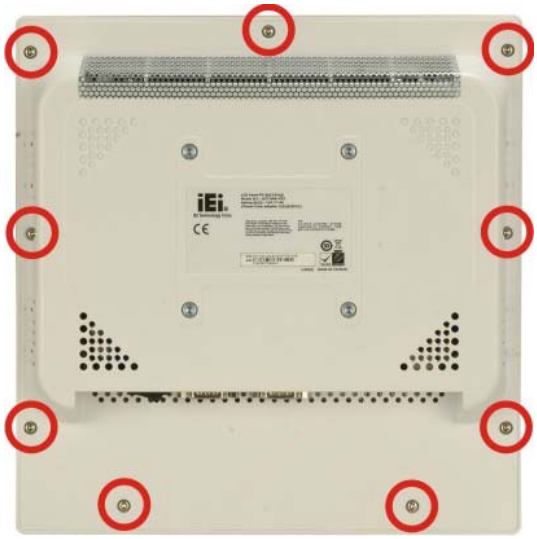


**Figure 6-1: Rear Panel Retention Screws**

**Step 5:** **Remove the aluminum cover**. The system motherboard is installed inside the aluminum chassis. Remove the nine retention screws (Figure 6-2) from the aluminum chassis and lift the aluminum cover off the ACT-08A-CX2.

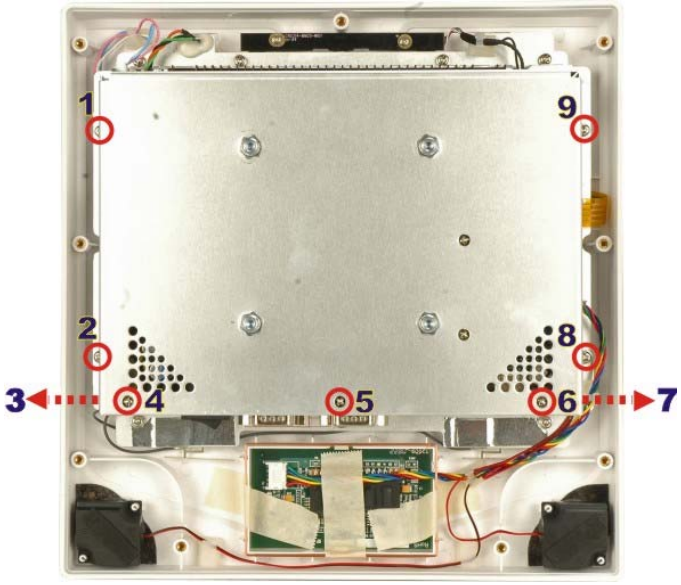



**Figure 6-2: Aluminum Chassis Cover Retention Screws**

## 6.5 Replacing Components

### 6.5.1 CF Card Replacement

The ACT-08A-CX2 has one CF Type II slot. To replace the CF card, follow the instructions below.

**Step 1:** **Follow all anti-static procedures**. See **Section 6.2**.

**Step 2:** **Turn off the power**. See **Section 6.3**.

**Step 3:** Follow the steps described in **Section 4.6** to replace the CF card.

### 6.5.2 SO-DIMM Module Replacement

**WARNING:**

Using incorrectly specified SO-DIMM may cause permanently damage the ACT-08A-CX2. Please make sure the purchased SO-DIMM complies with the memory specifications of the ACT-08A-CX2.

To replace the SO-DIMM module, please follow the steps below.

**Step 1:** **Follow all anti-static procedures**. See **Section 6.2**.

**Step 2:** **Turn off the power**. See **Section 6.3**.

**Step 3:** **Remove the back panel**. See **Section 6.4**.

**Step 4:** **Locate the SO-DIMM module**. See **Figure 6-3**.

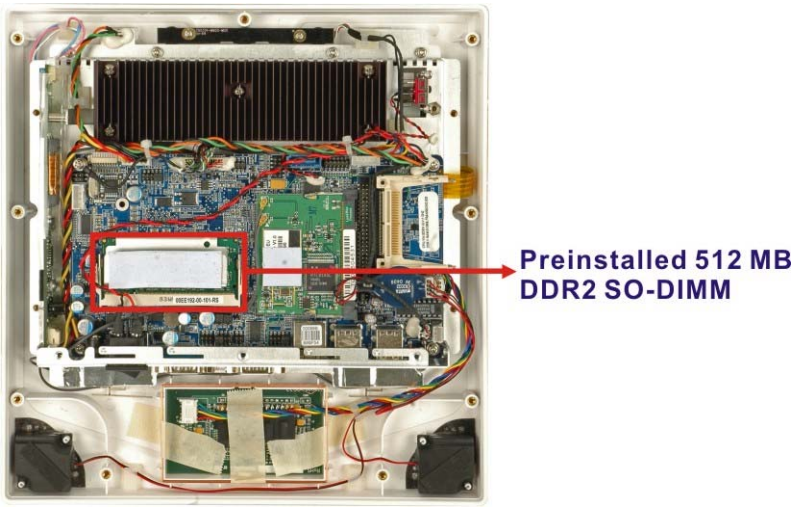



**Figure 6-3: SO-DIMM Socket Location**

**Step 5:** **Open the SO-DIMM socket arms**. Gently pull the arms of the SO-DIMM socket out and remove the old SO-DIMM.

**Step 6:** **Align the SO-DIMM with the socket**. The SO-DIMM must be oriented in such a way that the notch in the middle of the SO-DIMM must be aligned with the plastic bridge in the socket.

**Step 7:** **Insert the SO-DIMM**. Push the SO-DIMM chip into the socket at an angle (**Figure 6-4**).

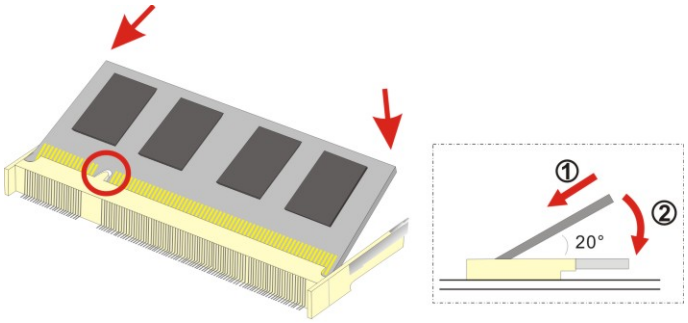



**Figure 6-4: SO-DIMM Installation**

**Step 8:** **Secure the SO-DIMM**. Push the SO-DIMM down. The clip into place and secure the SO-DIMM in the socket.

### 6.5.3 Wireless Module Replacement

To replace the wireless module, please follow the steps below.

**Step 1:** **Follow all anti-static procedures**. See **Section 6.2**.

**Step 2:** **Turn off the power**. See **Section 6.3**.

**Step 3:** **Remove the back panel**. See **Section 6.4**.

**Step 4:** **Locate the wireless module**. The wireless module is located below the CPU heat sink. See **Figure 6-5**.

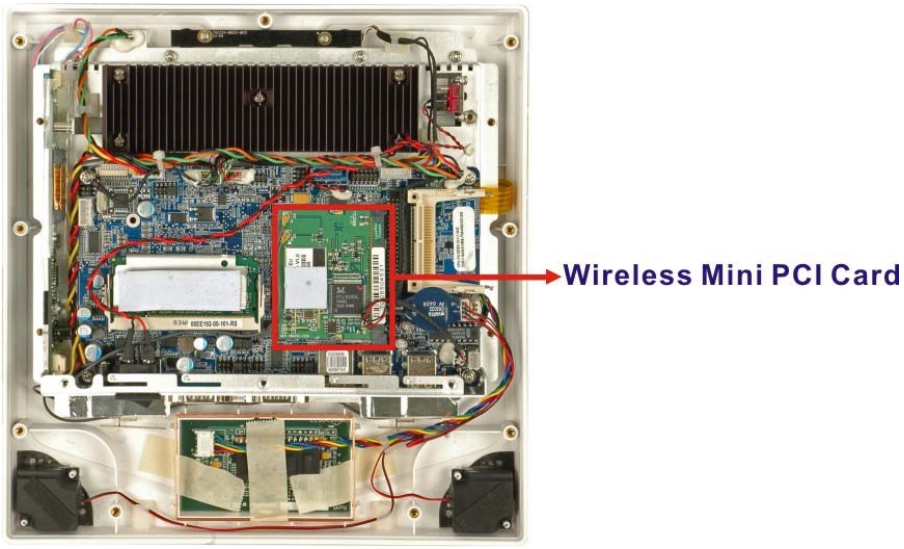



**Figure 6-5: Wireless Module Location**

**Step 5:** **Open the Mini PCI socket arm clips**. The Mini PCI socket has two arm clips that secure the Mini PCI wireless module into the socket. Before the wireless module can be removed from the socket, the arm clips must be opened.

**Step 6:** **Remove the wireless module**. Once the two arm clips of the Mini PCI socket are open, remove the wireless module from the socket.

**Step 7:** **Align the new wireless module with the Mini PCI socket**. The wireless module must be oriented in such a way that the notch in the wireless module must be aligned with the plastic bridge in the socket. See **Figure 6-6**.

**Step 8:** **Insert the wireless module**. Push the wireless module into the socket at an angle. See **Figure 6-6**.

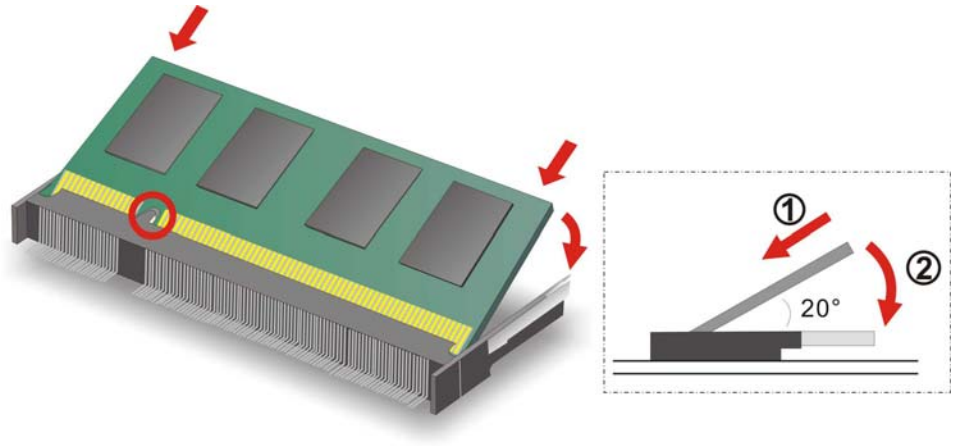



**Figure 6-6: Installing a Wireless Module**

**Step 9:** **Secure the wireless module**. Push the wireless module down until the two arm clips into place, securing the card in place.

### 6.5.4 Motherboard Replacement

A user cannot replace a motherboard. If the motherboard fails it must be shipped back to IEI to be replaced. If the system motherboard has failed, please contact the system vendor, reseller or an IEI sales person directly.

Chapter

7

# AMI BIOS Setup

## 7.1 Introduction

A licensed copy of AMI BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

### 7.1.1 Starting Setup

The AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before the **DELETE** key is pressed, restart the computer and try again.

### 7.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in.

| Key | Function |
|---|---|
| Up arrow | Move to previous item |
| Down arrow | Move to next item |
| Left arrow | Move to the item on the left hand side |
| Right arrow | Move to the item on the right hand side |
| Esc key | Main Menu – Quit and not save changes into CMOS<br>Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu |
| Page Up key | Increase the numeric value or make changes |
| Page Dn key | Decrease the numeric value or make changes |

| | |
|---|---|
| F1 key | General help, only for Status Page Setup Menu and Option Page Setup Menu |
| F2 /F3 key | Change color from total 16 colors. F2 to select color forward. |
| F10 key | Save all the CMOS changes, only for Main Menu |

**Table 7-1: BIOS Navigation Keys**

### 7.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

### 7.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in **Chapter 5**.

### 7.1.5 BIOS Menu Bar

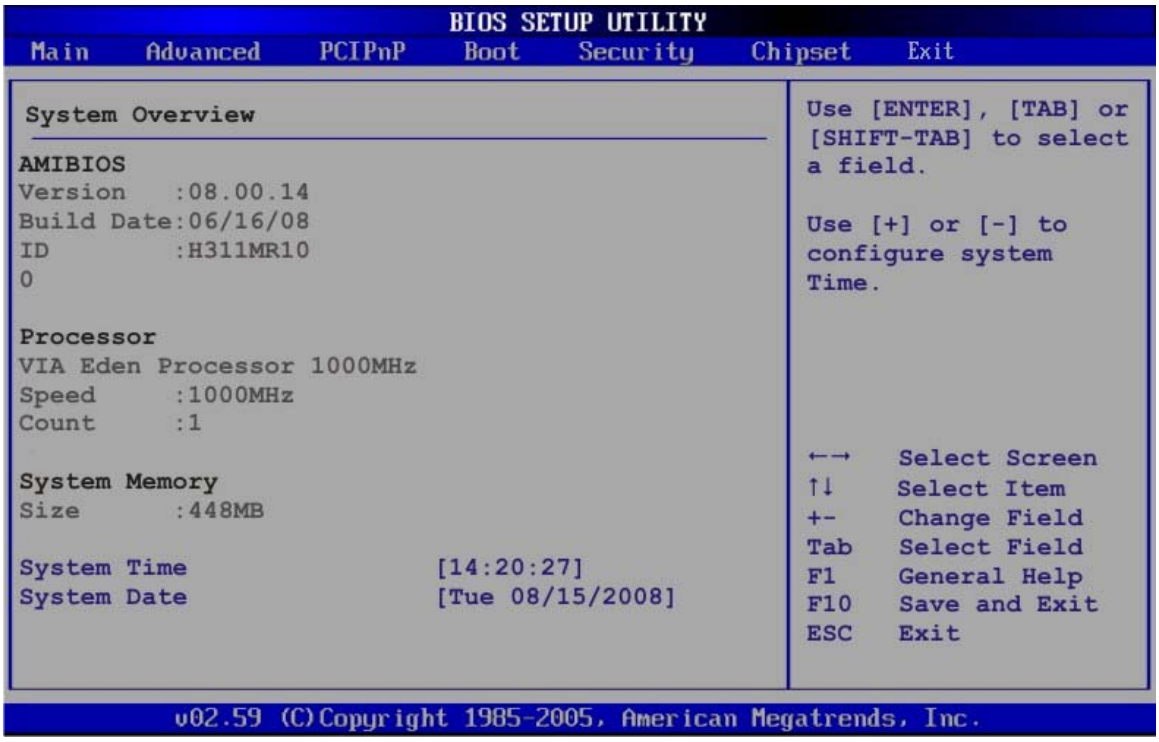
The **menu bar** on top of the BIOS screen has the following main items:

- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **Exit** Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

## 7.2 Main

The Main BIOS menu (**BIOS Menu 1**) appears when the BIOS Setup program is entered. The Main menu gives an overview of the basic system information.




**BIOS Menu 1: Main**

➔ **System Overview**

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- **AMI BIOS**: Displays auto-detected BIOS information
  - **Version**: Current BIOS version
  - **Build Date**: Date the current BIOS version was made
  - **ID**: Installed BIOS ID
- **Processor**: Displays auto-detected CPU specifications
  - **Type**: Names the currently installed processor
  - **Speed**: Lists the processor speed

- **Count**: The number of CPUs on the motherboard

- **System Memory**: Displays the auto-detected system memory.
  - **Size**: Lists memory size

**The System Overview field also has two user configurable fields:**

➔ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

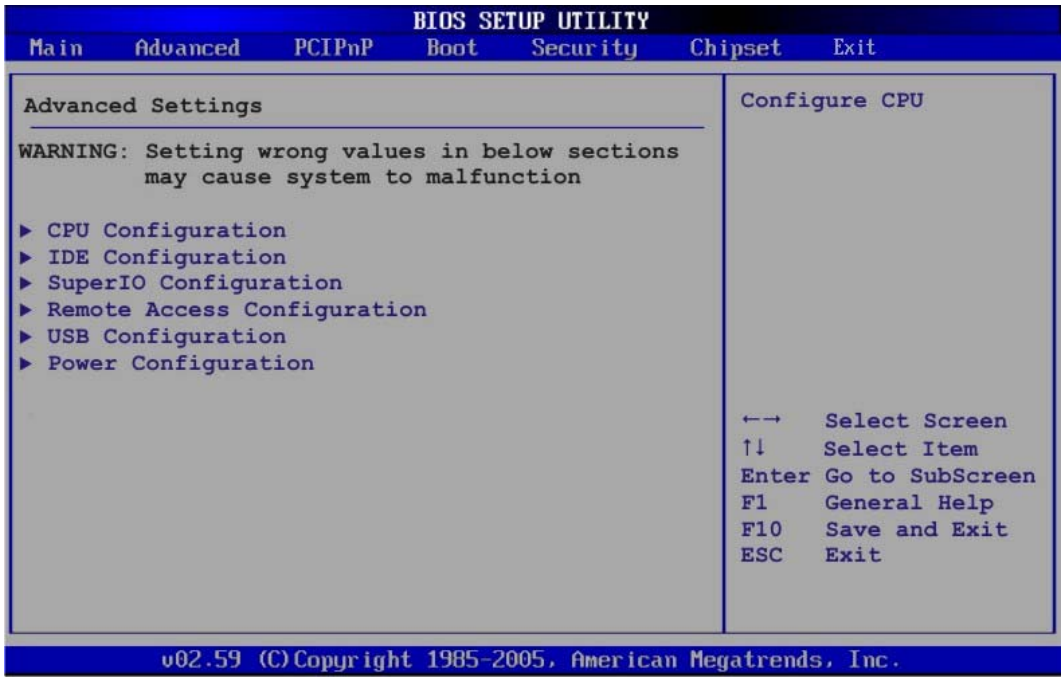
## 7.3 Advanced

Use the **Advanced** menu to configure the CPU and peripheral devices through the following sub-menus:

**WARNING:**

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

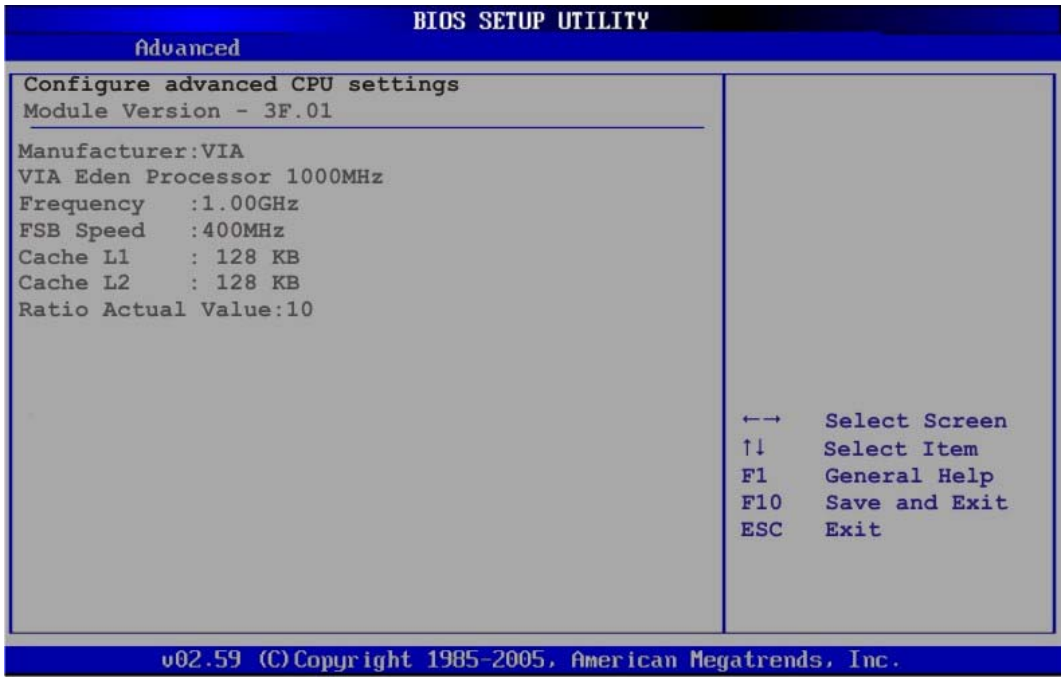
- **CPU Configuration** (see **Section 7.3.1**)
- **IDE Configuration** (see **Section 7.3.2**)
- **SuperIO Configuration** (see **Section 7.3.3**)
- **Remote Access Configuration** (see **Section 7.3.4**)
- **USB Configuration** (see **Section 7.3.5**)
- **Power Configuration** (see **Section 7.3.6**)




**BIOS Menu 2: Advanced**

### 7.3.1 CPU Configuration

Use the CPU Configuration menu (**BIOS Menu 3**) to view detailed CPU specifications and configure the CPU.



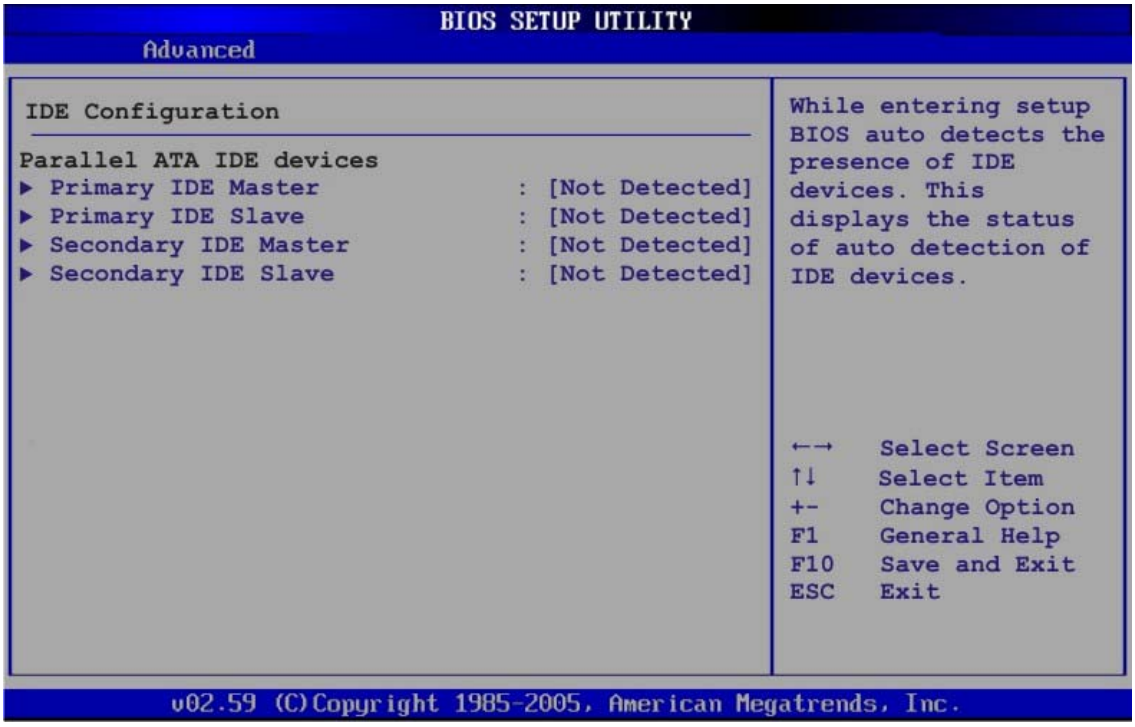

**BIOS Menu 3: CPU Configuration**

The CPU Configuration menu (**BIOS Menu 3**) lists the following CPU details:

- Manufacturer: Lists the name of the CPU manufacturer
- Frequency: Lists the CPU processing speed
- FSB Speed: Lists the FSB speed
- Cache L1: Lists the CPU L1 cache size
- Cache L2: Lists the CPU L2 cache size

### 7.3.2 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 4**) to change and/or set the configuration of the IDE devices installed in the system.


BIOS SETUP UTILITY
Advanced
IDE Configuration
Parallel ATA IDE devices
▶ Primary IDE Master : [Not Detected]
▶ Primary IDE Slave : [Not Detected]
▶ Secondary IDE Master : [Not Detected]
▶ Secondary IDE Slave : [Not Detected]
While entering setup BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
←→ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.59 (C)Copyright 1985-2005, American Megatrends, Inc.

**BIOS Menu 4: IDE Configuration**

➔ **IDE Master and IDE Slave**

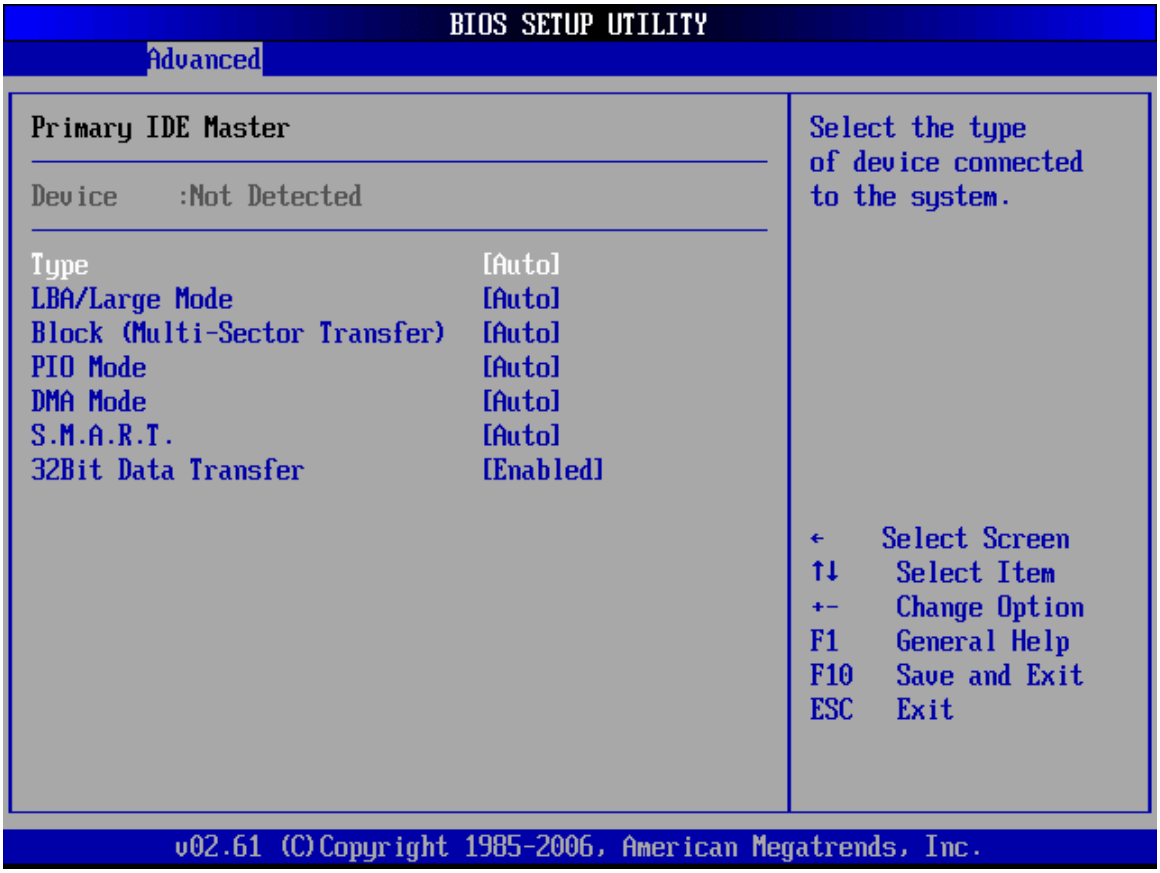
When entering setup, BIOS auto detects the presence of IDE devices. BIOS displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 7.3.2.1** appear.

### 7.3.2.1 IDE Master, IDE Slave

Use the **IDE Master** and **IDE Slave** configuration menu to view both primary and secondary IDE device details and configure the IDE devices connected to the system.




**BIOS Menu 5: IDE Master and IDE Slave Configuration**

➔ **Auto-Detected Drive Parameters**

The "grayed-out" items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- **Device**: Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Type**: Indicates the type of devices a user can manually select
- **Vendor**: Lists the device manufacturer

- **Size**: List the storage capacity of the device.
- **LBA Mode**: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode**: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.
- **PIO Mode**: Indicates the PIO mode of the installed device.
- **Async DMA**: Indicates the highest Asynchronous DMA Mode that is supported.
- **Ultra DMA**: Indicates the highest Synchronous DMA Mode that is supported.
- **S.M.A.R.T.**: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- **32Bit Data Transfer**: Enables 32-bit data transfer.

➔ **Type [Auto]**

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

| | | |
|---|---|---|
| ➔ **Not Installed** | | BIOS is prevented from searching for an IDE disk drive on the specified channel. |
| ➔ **Auto** | **DEFAULT** | The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel. |
| ➔ **CD/DVD** | | The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel. |
| ➔ **ARMD** | | This option specifies an ATAPI Removable Media Device. These include, but are not limited to: |

➔ **ZIP**

➔ **LS-120**

➔ **LBA/Large Mode [Auto]**

Use the **LBA/Large Mode** option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

| | | |
|---|---|---|
| ➔ **Disabled** | | BIOS is prevented from using the LBA mode control on the specified channel. |
| ➔ **Auto** | **DEFAULT** | BIOS auto detects the LBA mode control on the specified channel. |

➔ **Block (Multi Sector Transfer) [Auto]**

Use the **Block (Multi Sector Transfer)** to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

| | | |
|---|---|---|
| ➔ **Disabled** | | BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time. |
| ➔ **Auto** | **DEFAULT** | BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time. |

➔ **PIO Mode [Auto]**

Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

- **Auto** **DEFAULT** BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.
- **0** PIO mode 0 selected with a maximum transfer rate of 3.3MBps
- **1** PIO mode 1 selected with a maximum transfer rate of 5.2MBps
- **2** PIO mode 2 selected with a maximum transfer rate of 8.3MBps
- **3** PIO mode 3 selected with a maximum transfer rate of 11.1MBps
- **4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

- **Auto** **DEFAULT** BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.
- **SWDMA0** Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1MBps
- **SWDMA1** Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps
- **SWDMA2** Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps
- **MWDMA0** Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps
- **MWDMA1** Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3MBps

- **MWDMA2** Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps
- **UDMA1** Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps
- **UDMA1** Ultra DMA mode 1 selected with a maximum data transfer rate of 25MBps
- **UDMA2** Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps
- **UDMA3** Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- **UDMA4** Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- **UDMA5** Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **S.M.A.R.T [Auto]**

Use the **S.M.A.R.T** option to auto-detect, disable or enable Self-Monitoring Analysis and Reporting Technology (SMART) on the drive on the specified channel. **S.M.A.R.T** predicts impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

- **Auto** **DEFAULT** BIOS auto detects HDD SMART support.
- **Disabled** Prevents BIOS from using the HDD SMART feature.
- **Enabled** Allows BIOS to use the HDD SMART feature

➔ **32Bit Data Transfer [Enabled]**

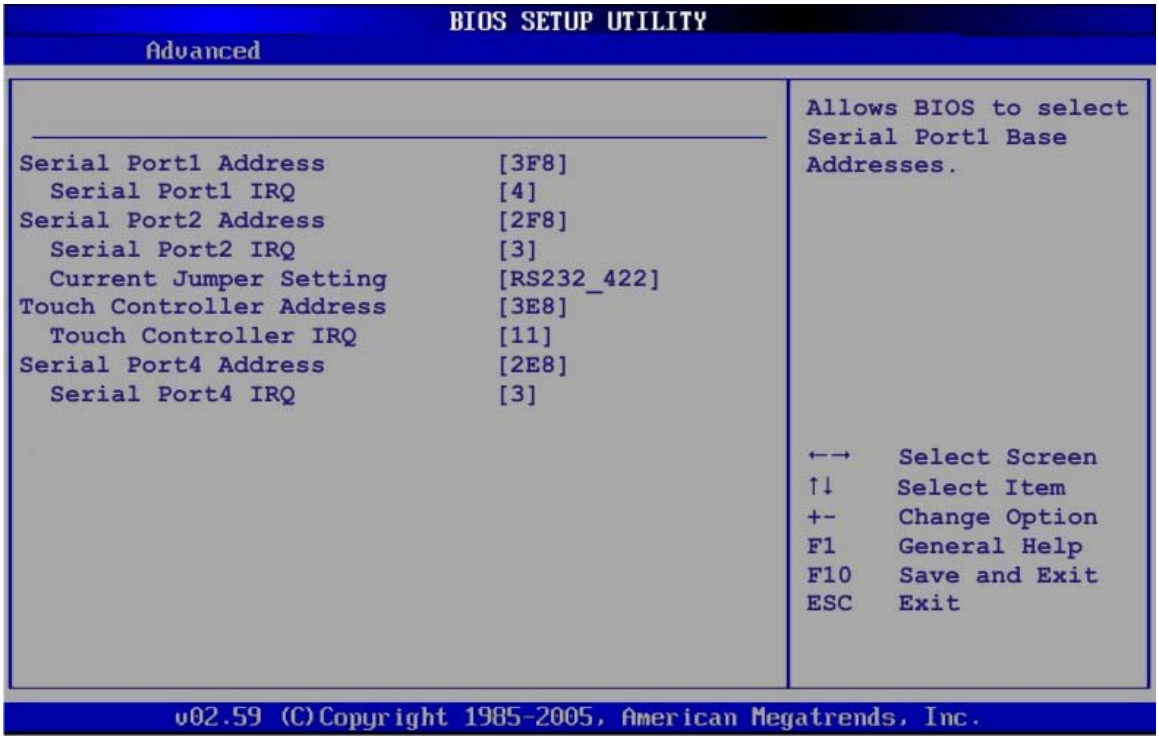
Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

➔ **Disabled** Prevents the BIOS from using 32-bit data transfers.

➔ **Enabled** **DEFAULT** Allows BIOS to use 32-bit data transfers on supported hard disk drives.

### 7.3.3 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 6**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.




**BIOS Menu 6: Super IO Configuration**

➔ **Serial Port1 Address [3F8]**

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

- ➔ **Disabled** No base address is assigned to Serial Port 1
- ➔ **3F8** **DEFAULT** Serial Port 1 I/O port address is 3F8
- ➔ **2F8** Serial Port 1 I/O port address is 2F8
- ➔ **2E8** Serial Port 1 I/O port address is 2E8

➔ **Serial Port1 IRQ [4]**

Use the **Serial Port1 IRQ** option to select the Serial Port 1 interrupt address.

- ➔ **4** **DEFAULT** IRQ4 is assigned as the serial port 1 interrupt address

➔ **Serial Port2 Address [2F8]**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

- ➔ **Disabled** No base address is assigned to Serial Port 2
- ➔ **3F8** Serial Port 2 I/O port address is 3F8
- ➔ **2F8** **DEFAULT** Serial Port 2 I/O port address is 2F8
- ➔ **2E8** Serial Port 2 I/O port address is 2E8

➔ **Serial Port2 IRQ [3]**

Use the **Serial Port2 IRQ** option to select the Serial Port 2 interrupt address.

- ➔ **3** **DEFAULT** IRQ3 is assigned as the serial port 2 interrupt address

➔ **Touch Controller Address [3E8]**

Use the **Touch Controller Address** option to select the base addresses for touch screen controller.

- ➔ **3E8** **DEFAULT** Touch screen controller port address is 3E8

➔ **Touch Controller IRQ [11]**

Use the **Touch Controller IRQ** option to select the touch screen controller interrupt address.

➔ **11** **DEFAULT** IRQ11 is assigned as the touch controller interrupt address

➔ **Serial Port4 Address [2E8]**

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

➔ **Disabled** No base address is assigned to serial port 3

➔ **2E8** **DEFAULT** Serial port 4 I/O port address is 2E8

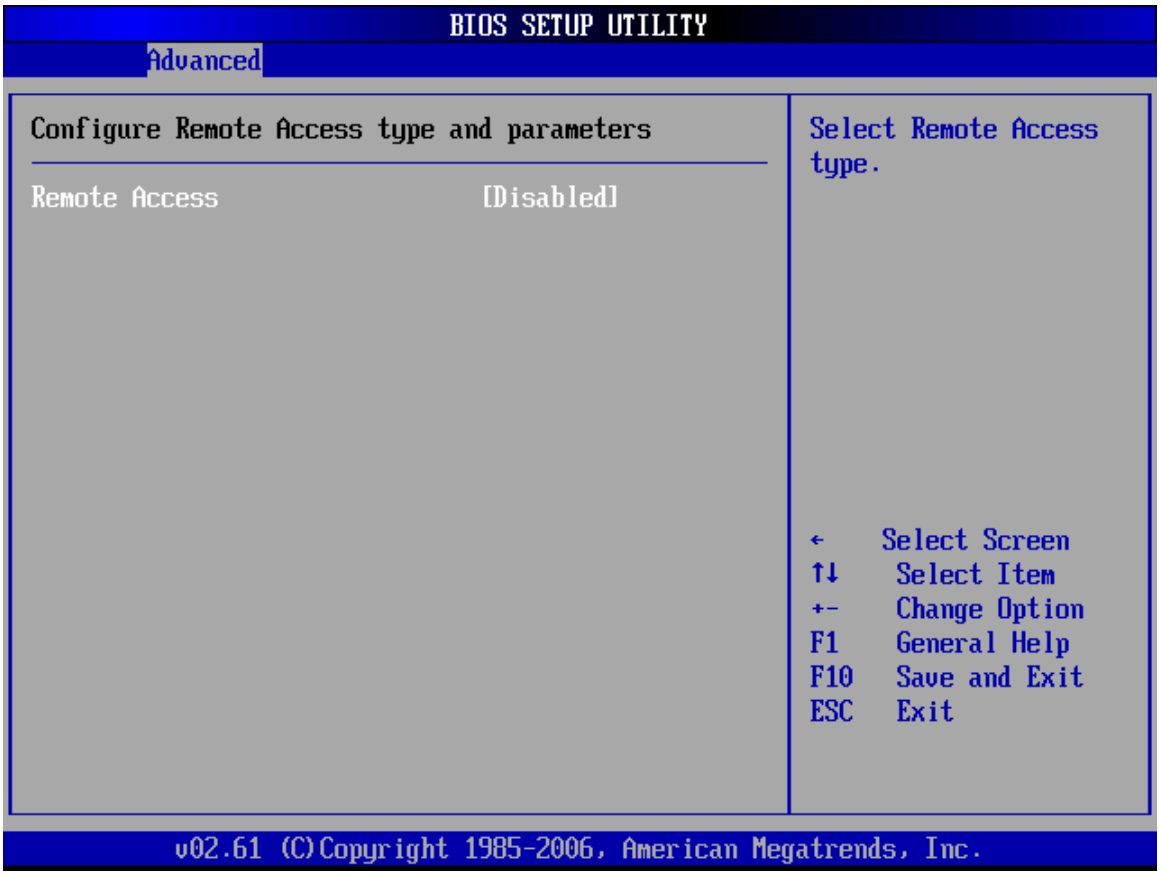
➔ **Serial Port4 IRQ [4]**

Use the **Serial Port4 IRQ** option to select the Serial Port 4 interrupt address.

➔ **3** **DEFAULT** IRQ3 is assigned as the serial port 4 interrupt address

### 7.3.4 Remote Access Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 7**) to configure remote access parameters. The **Remote Access Configuration** is an AMIBIOS feature and allows a remote host running a terminal program to display and configure the BIOS settings.




**BIOS Menu 7: Remote Access Configuration [Advanced]**

➔ **Remote Access [Disabled]**

Use the **Remote Access** option to enable or disable access to the remote functionalities of the system.

➔ **Disabled** **DEFAULT** Remote access is disabled.

➔ **Enabled** Remote access configuration options shown below appear:

- ➔ **Serial Port Number**
- ➔ **Serial Port Mode**

➔ **Redirection after BIOS POST**

➔ **Terminal Type**

These configuration options are discussed below.

➔ **Serial Port Number [COM1]**

Use the **Serial Port Number** option to select the serial port used for remote access.

| | | |
|---|---|---|
| ➔ **COM1** | **DEFAULT** | System is remotely accessed through COM1 |
| ➔ **COM2** | | System is remotely accessed through COM2 |
| ➔ **COM4** | | System is remotely accessed through COM4 |

**NOTE**: Make sure the selected COM port is enabled through the Super I/O configuration menu.

➔ **Base Address, IRQ [3F8h,4]**

The **Base Address, IRQ** option cannot be configured and only shows the interrupt address of the serial port listed above.

➔ **Serial Port Mode [115200 8,n,1]**

Use the **Serial Port Mode** option to select baud rate through which the console redirection is made. The following configuration options are available

- 115200 8,n,1 **DEFAULT**
- 57600 8,n,1
- 38400 8,n,1
- 19200 8,n,1
- 09600 8,n,1

**NOTE:**

Identical baud rate setting musts be set on the host (a management computer running a terminal software) and the slave

➔ **Redirection After BIOS POST [Always]**

Use the **Redirection After BIOS POST** option to specify when console redirection should occur.

| | | |
|---|---|---|
| ➔ **Disabled** | | The console is not redirected after POST |
| ➔ **Boot Loader** | | Redirection is active during POST and during Boot Loader |
| ➔ **Always** | **DEFAULT** | Redirection is always active (Some OSes may not work if set to Always) |

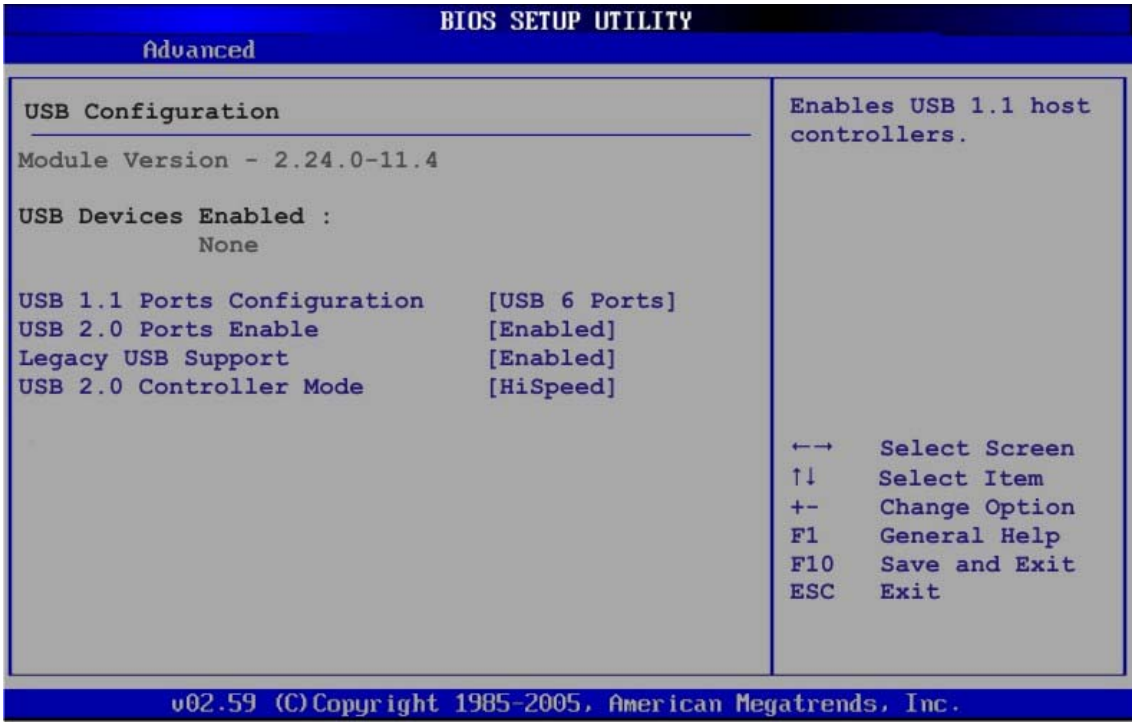
➔ **Terminal Type [ANSI]**

Use the **Terminal Type** BIOS option to specify the remote terminal type.

| | | |
|---|---|---|
| ➔ **ANSI** | **DEFAULT** | The target terminal type is ANSI |
| ➔ **VT100** | | The target terminal type is VT100 |
| ➔ **VT-UTF8** | | The target terminal type is VT-UTF8 |

### 7.3.5 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 8**) to read USB configuration information and configure the USB settings.




**BIOS Menu 8: USB Configuration**

➔ **USB 1.1 Ports Configuration [USB 6 Ports]**

Use the **USB 1.1 Ports Configuration** BIOS option to enable a specified number of USB 1.1 ports. If only two USB ports are being used, disabling the remaining six USB frees up system resources that can be redirected elsewhere.

| | | | |
|---|---|---|---|
| ➔ | **Disabled** | | USB function support disabled |
| ➔ | **USB 2 Ports** | | Two USB ports are enabled |
| ➔ | **USB 4 Ports** | | Four USB ports are enabled |
| ➔ | **USB 6 Ports** | **DEFAULT** | Six USB ports are enabled |

➔ **USB 2.0 Ports Enable [Enabled]**

The **USB 2.0 Ports Enable** BIOS option enables or disables the USB 2.0 ports.

| | | |
|---|---|---|
| ➔ | **Disabled** | USB EHCI function disabled |

➔ **Enabled** **DEFAULT** USB function enabled

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔ **Disabled** Legacy USB support disabled

➔ **Enabled** **DEFAULT** Legacy USB support enabled

➔ **Auto** Legacy USB support disabled if no USB devices are connected

➔ **USB2.0 Controller Mode [HiSpeed]**

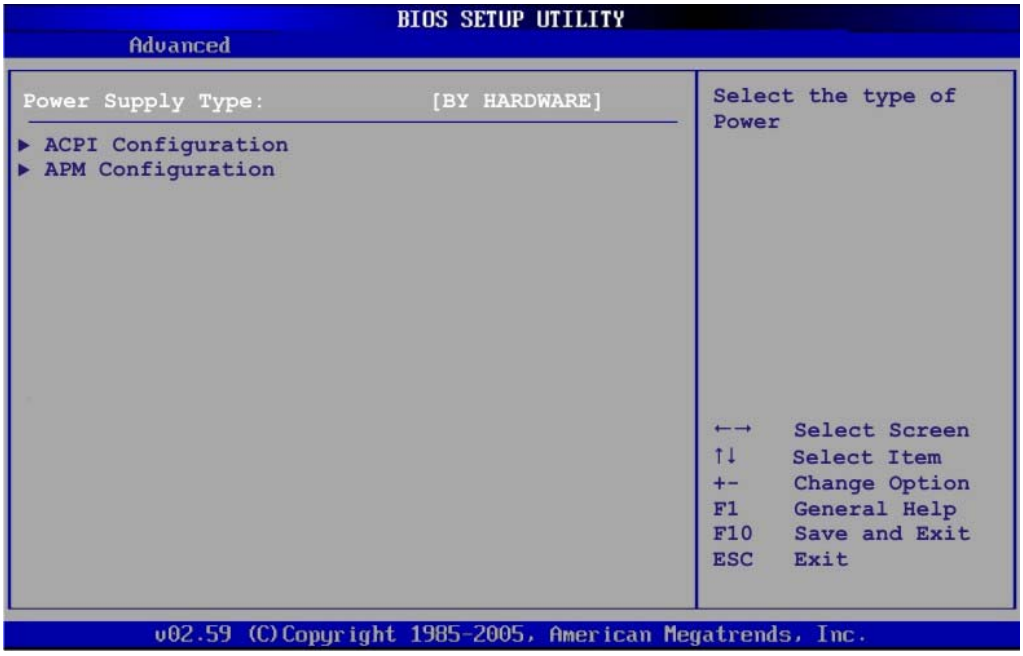
Use the **USB2.0 Controller Mode** option to set the speed of the USB2.0 controller.

➔ **FullSpeed** The controller is capable of operating at 12Mb/s

➔ **HiSpeed** **DEFAULT** The controller is capable of operating at 480Mb/s

### 7.3.6 Power Configuration

The **Power** menu configures the system in AT or ATX mode.




**BIOS Menu 9: Power Menu**

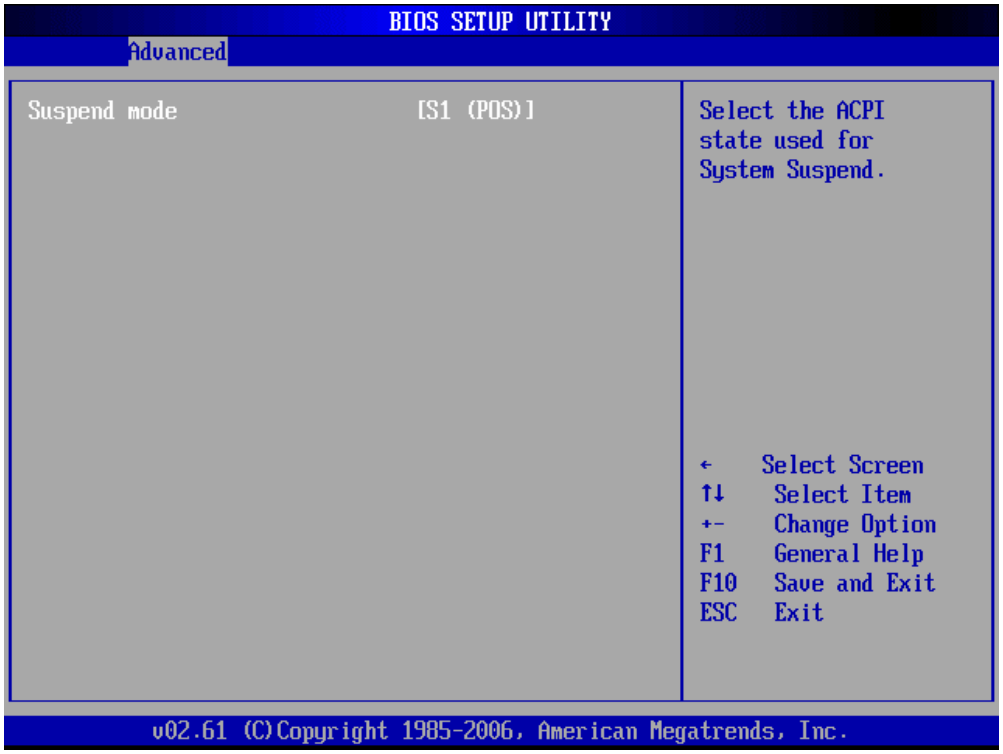
➔ **Power Supply Type: [BY HARDWARE]**

Use the **Power Supply Type** option to specify the power mode of the system.

| | | |
|---|---|---|
| ➔ **ATX power** | | System is in the ATX power mode |
| ➔ **AT power** | | System is in the AT power mode |
| ➔ **BY HARDWARE** | **DEFAULT** | The power mode is set by the AT/ATX switch on the system |

## 7.3.7 ACPI Configuration

The **ACPI Configuration** menu (**BIOS Menu 10**) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.




**BIOS Menu 10: ACPI Configuration**

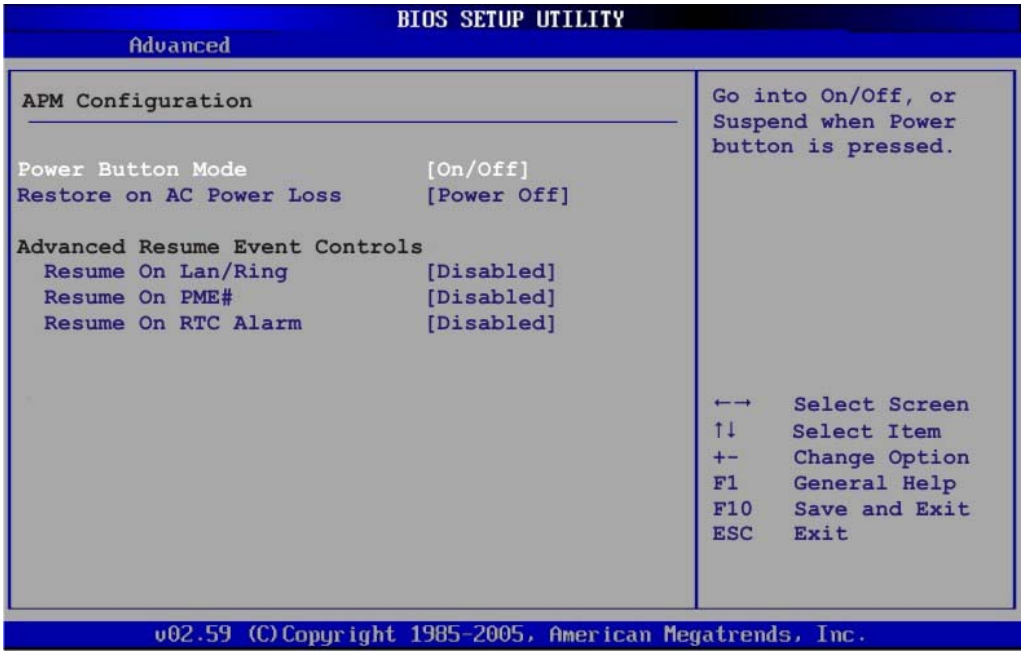
➔ **Suspend Mode [S1(POS)]**

Use the **Suspend Mode** option to specify the sleep state the system enters when it is not being used.

➔ **S1 (POS) DEFAULT** System appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

### 7.3.8 APM Configuration

The APM Configuration menu (**BIOS Menu 11**) allows the advanced power management options to be configured.


BIOS SETUP UTILITY
Advanced
APM Configuration
Power Button Mode [On/Off]
Restore on AC Power Loss [Power Off]
Advanced Resume Event Controls
Resume On Lan/Ring [Disabled]
Resume On PME# [Disabled]
Resume On RTC Alarm [Disabled]
Go into On/Off, or Suspend when Power button is pressed.
←→ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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**BIOS Menu 11:Advanced Power Management Configuration**

➔ **Power Button Mode [On/Off]**

Use the **Power Button Mode** BIOS to specify how the power button functions.

➔ **On/Off** **DEFAULT** When the power button is pressed the system is either turned on or off

➔ **Suspend** When the power button is pressed the system goes into suspend mode

➔ **Restore on AC Power Loss [Power Off]**

Use the **Restore on AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

➔ **Power Off** **DEFAULT** The system remains turned off

➔ **Power On** The system turns on

➔ **Last State** The system returns to its previous state. If it was on, it

turns itself on. If it was off, it remains off.

➔ **Resume on Lan/Ring [Disabled]**

Use the **Resume on Lan/Ring** BIOS option to enable activity on the RI (ring in) modem line to rouse the system from a suspend or standby state. That is, the system will be roused by an incoming call on a modem.

| | | |
|---|---|---|
| ➔ **Disabled** | **DEFAULT** | Wake event not generated by an incoming call |
| ➔ **Enabled** | | Wake event generated by an incoming call |

➔ **Resume on PME# [Disabled]**

Use the **Resume on PME#** BIOS option to enable activity on the PCI PME (power management event) controller to rouse the system from a suspend or standby state.

| | | |
|---|---|---|
| ➔ **Disabled** | **DEFAULT** | Wake event not generated by PCI PME controller activity |
| ➔ **Enabled** | | Wake event generated by PCI PME controller activity |

➔ **Resume On RTC Alarm [Disabled]**

Use the **Resume On RTC Alarm** option to specify the time the system should be roused from a suspended state.

| | | |
|---|---|---|
| ➔ **Disabled** | **DEFAULT** | The real time clock (RTC) cannot generate a wake event |
| ➔ **Enabled** | | If selected, the following appears with values that can be selected: |

➔ **RTC Alarm Date (Days)**

➔ **System Time**

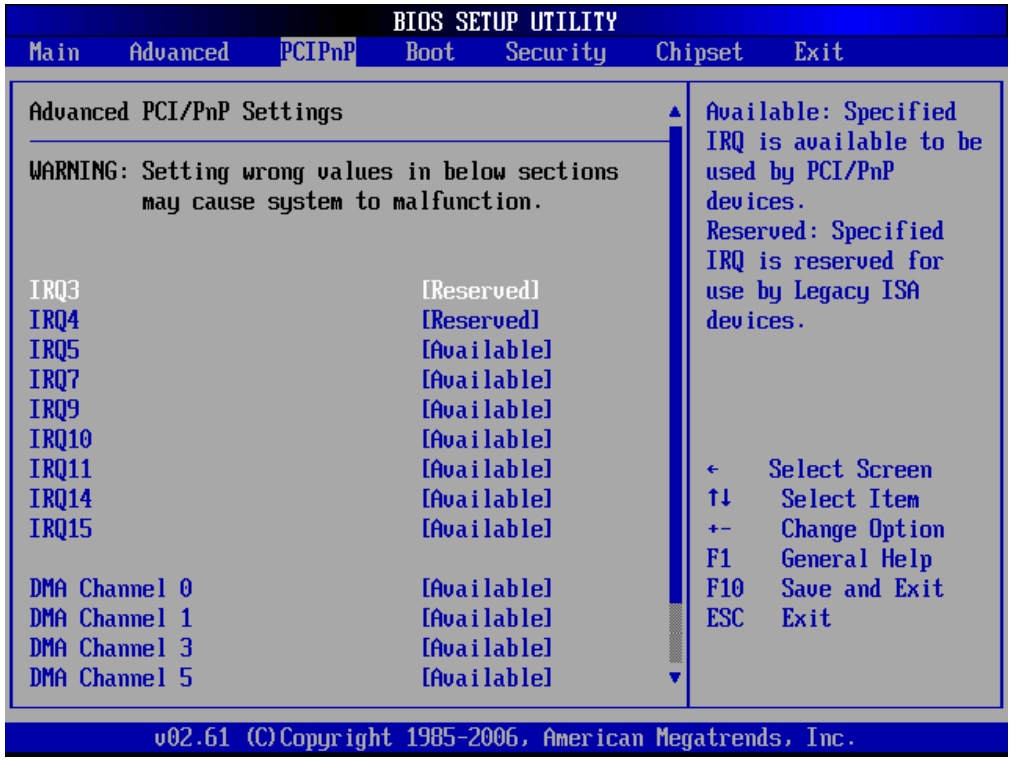
After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

## 7.4 PCI/PnP

Use the PCI/PnP menu (**BIOS Menu 12**) to configure advanced PCI and PnP settings.

**WARNING:**

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Advanced PCI/PnP Settings
WARNING: Setting wrong values in below sections may cause system to malfunction.
IRQ3 [Reserved]
IRQ4 [Reserved]
IRQ5 [Available]
IRQ7 [Available]
IRQ9 [Available]
IRQ10 [Available]
IRQ11 [Available]
IRQ14 [Available]
IRQ15 [Available]
DMA Channel 0 [Available]
DMA Channel 1 [Available]
DMA Channel 3 [Available]
DMA Channel 5 [Available]
Available: Specified IRQ is available to be used by PCI/PnP devices.
Reserved: Specified IRQ is reserved for use by Legacy ISA devices.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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**BIOS Menu 12: PCI/PnP Configuration**

➔ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

➔ **Available** **DEFAULT** The specified IRQ is available to be used by PCI/PnP devices

➔ **Reserved** The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7
- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

➔ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

➔ **Available** **DEFAULT** The specified DMA is available to be used by PCI/PnP devices

➔ **Reserved** The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0
- DM Channel 1

- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

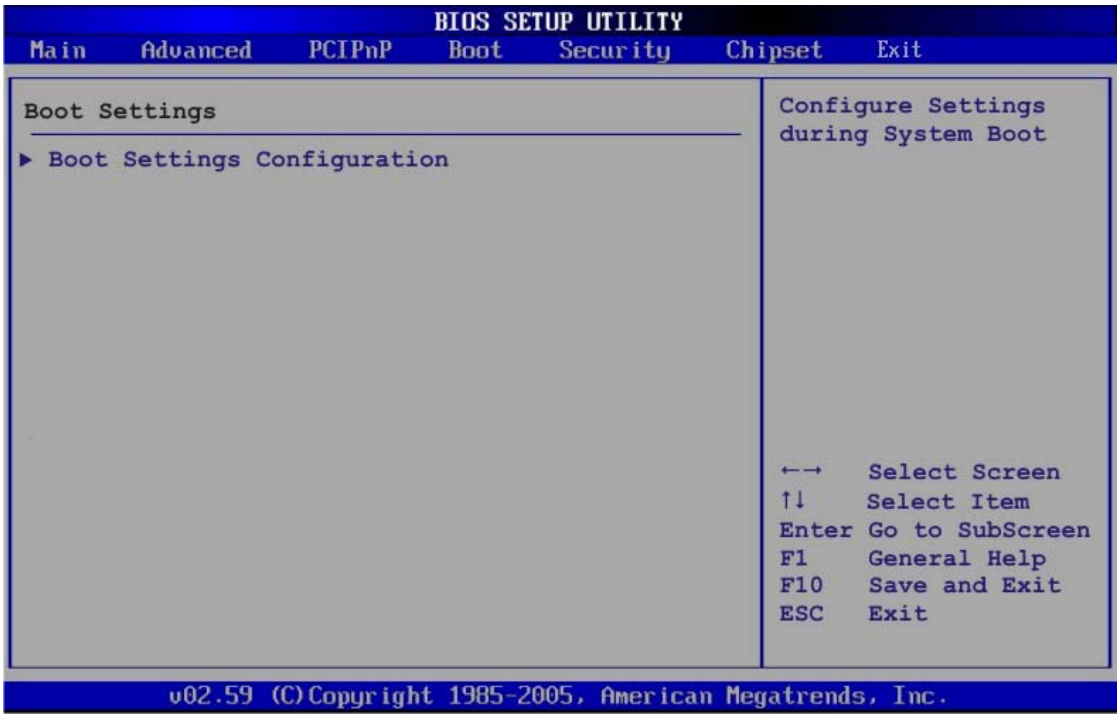
➔ **Reserved Memory Size [Disabled]**

Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

| | | | |
|---|---|---|---|
| ➔ | **Disabled** | **DEFAULT** | No memory block reserved for legacy ISA devices |
| ➔ | **16K** | | 16KB reserved for legacy ISA devices |
| ➔ | **32K** | | 32KB reserved for legacy ISA devices |
| ➔ | **64K** | | 54KB reserved for legacy ISA devices |

## 7.5 Boot

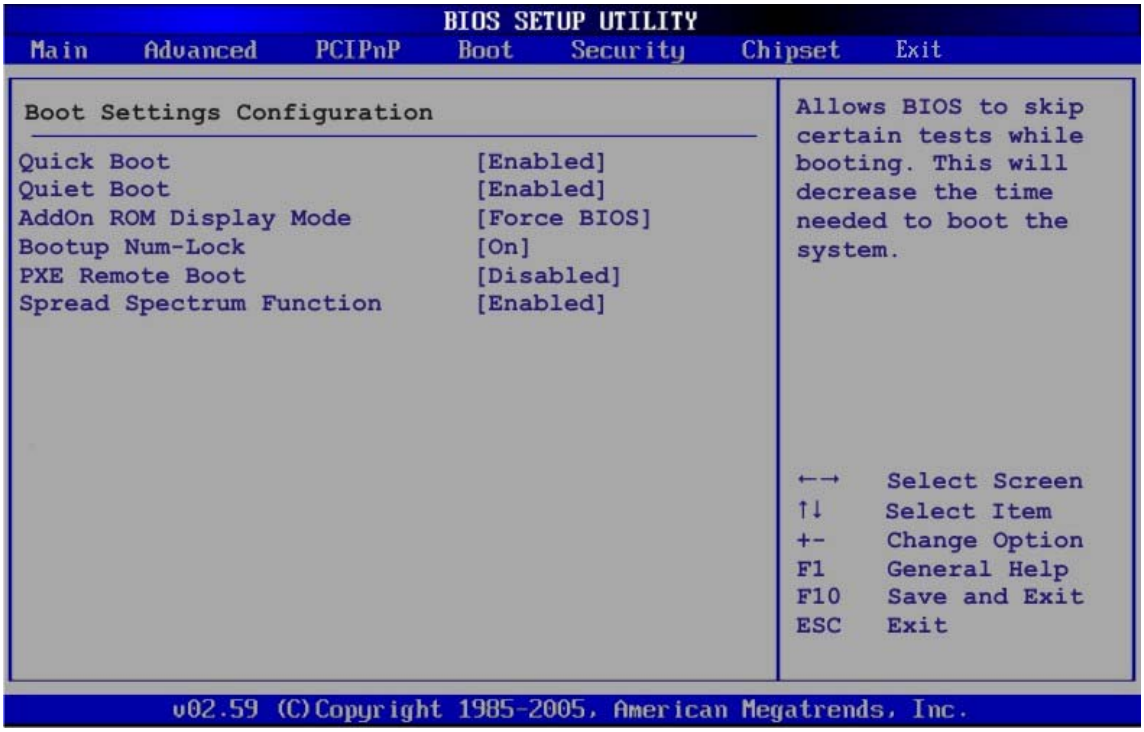
Use the Boot menu (**BIOS Menu 13**) to configure system boot options.




**BIOS Menu 13: Boot**

### 7.5.1 Boot Settings Configuration

Use the Boot Settings Configuration menu (**BIOS Menu 14**) to configure advanced system boot options.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Boot Settings Configuration
Quick Boot [Enabled]
Quiet Boot [Enabled]
AddOn ROM Display Mode [Force BIOS]
Bootup Num-Lock [On]
PXE Remote Boot [Disabled]
Spread Spectrum Function [Enabled]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
←→ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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**BIOS Menu 14: Boot Settings Configuration**

➔ **Quick Boot [Enabled]**

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

| | | |
|---|---|---|
| ➔ **Disabled** | | No POST procedures are skipped |
| ➔ **Enabled** | **DEFAULT** | Some POST procedures are skipped to decrease the system boot time |

➔ **Quiet Boot [Disabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

| | | |
|---|---|---|
| ➔ **Disabled** | **DEFAULT** | Normal POST messages displayed |
| ➔ **Enabled** | | OEM Logo displayed instead of POST messages |

➔ **AddOn ROM Display Mode [Force BIOS]**

The **AddOn ROM Display Mode** option allows add-on ROM (read-only memory) messages to be displayed.

| | | |
|---|---|---|
| ➔ **Force BIOS** | **DEFAULT** | Allows the computer system to force a third party BIOS to display during system boot. |
| ➔ **Keep Current** | | Allows the computer system to display the information during system boot. |

➔ **Bootup Num-Lock [Off]**

The **Bootup Num-Lock** BIOS option allows the Number Lock setting to be modified during boot up.

| | | |
|---|---|---|
| ➔ **Off** | **DEFAULT** | Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged. |
| ➔ **On** | | Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit. |

➔ **PXE Remote Boot [Disabled]**

Use the **PXE Remote Boot** option to enable the system to be booted from a remote system.

| | | |
|---|---|---|
| ➔ **Disabled** | **DEFAULT** | Cannot be booted from a remote system through the |

LAN

➔ **Enabled** **DEFAULT** Can be booted from a remote system through the LAN

➔ **Spread Spectrum Mode [Enabled]**

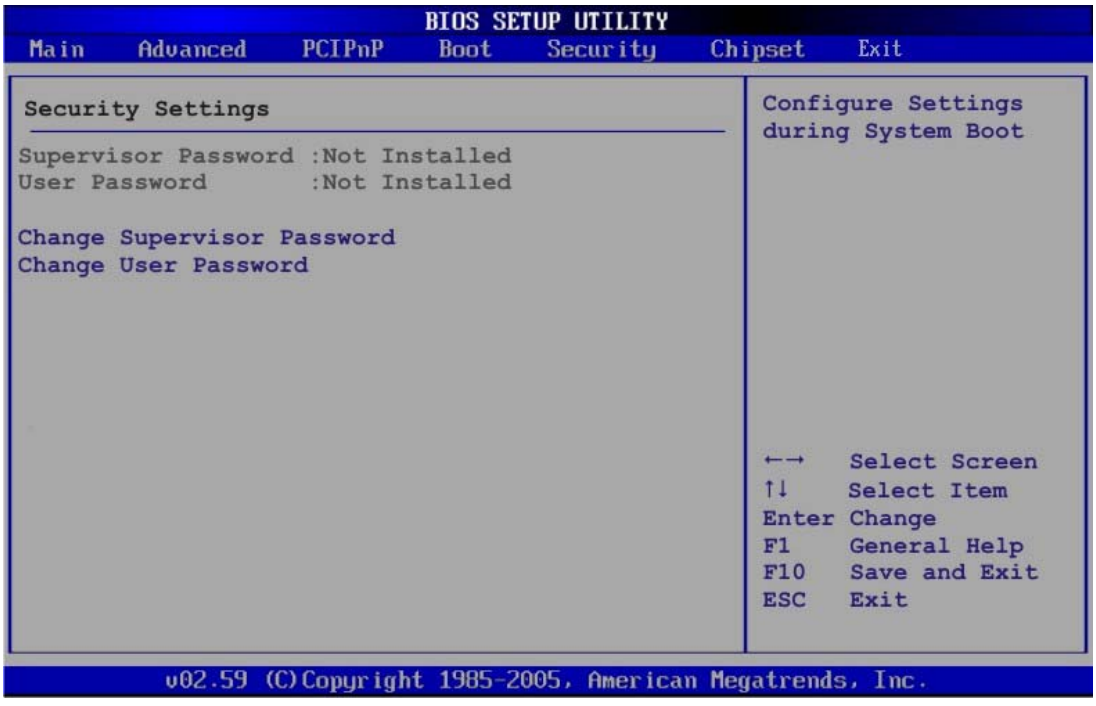
The **Spread Spectrum Mode** option can help to improve CPU EMI issues.

➔ **Disabled** The spread spectrum mode is disabled

➔ **Enabled** **DEFAULT** The spread spectrum mode is enabled

## 7.6 Security

Use the Security menu (**BIOS Menu 15**) to set system and user passwords.




**BIOS Menu 15: Security**

➔ **Change Supervisor Password**

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

➔ **Change User Password**

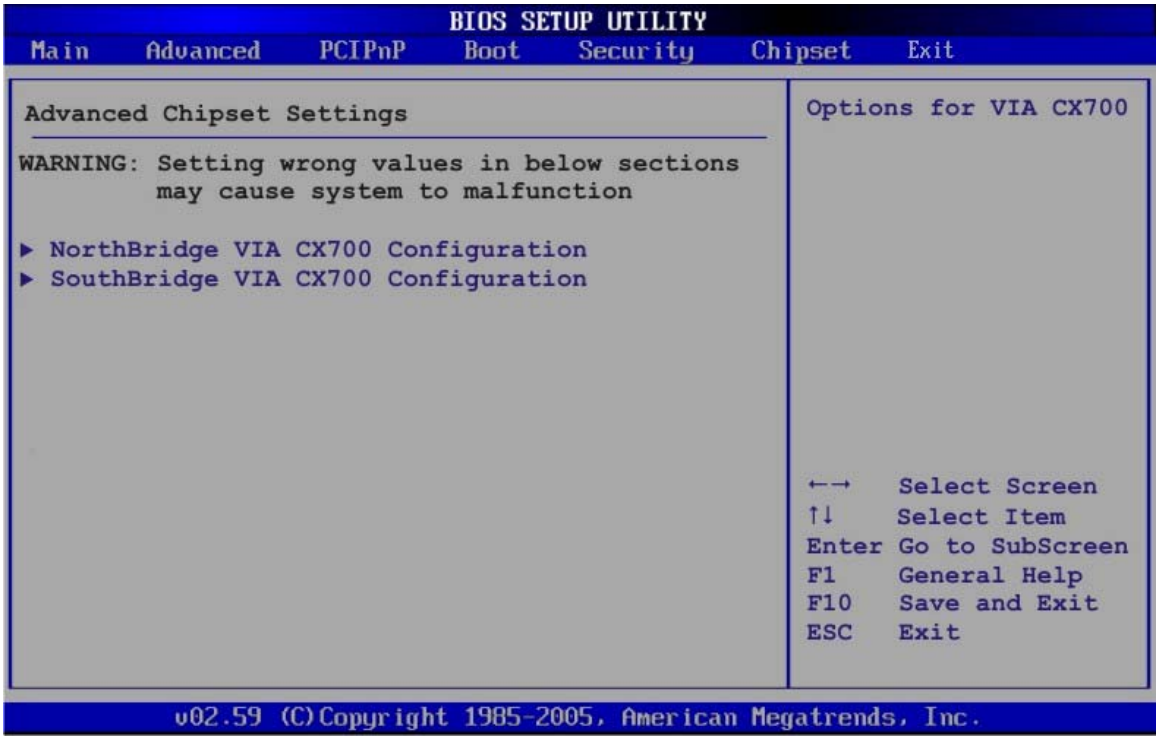
Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

## 7.7 Chipset

Use the **Chipset** menu to access the Northbridge and Southbridge configuration menus

**WARNING!**

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Advanced Chipset Settings
WARNING: Setting wrong values in below sections
may cause system to malfunction
▶ NorthBridge VIA CX700 Configuration
▶ SouthBridge VIA CX700 Configuration
Options for VIA CX700
←→ Select Screen
↑↓ Select Item
Enter Go to SubScreen
F1 General Help
F10 Save and Exit
ESC Exit
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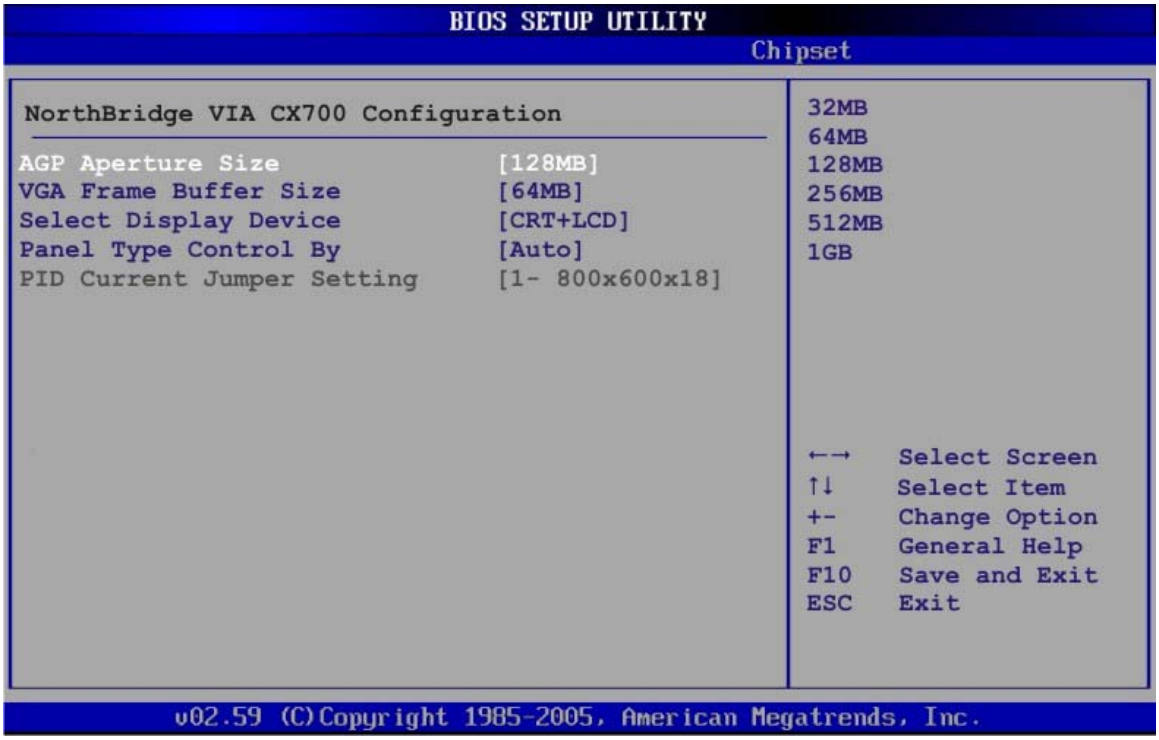
**BIOS Menu 16: Chipset**

### 7.7.1 NorthBridge VIA CX700 Configuration

Use the NorthBridge VIA CX700 Configuration menu (**BIOS Menu 17**) to check the northbridge chipset settings.




**BIOS Menu 17:NorthBridge Chipset Configuration**

➔ **AGP Aperture Size [128MB]**

Use the **AGP Aperture Size Select** option to select the size of the AGP aperture and the size of the GART (Graphics Address Relocation Table). The aperture is a portion on the PCI memory address range dedicated for use as AGP memory address space and the GART is a translation table that translates the AGP memory addresses into actual addresses. The following options are available.

- 32MB
- 64MB
- 128MB **DEFAULT**
- 256MB
- 512MB
- 1GB

➔ **Select Display Device [CRT + LCD]**

The **Select Display Device** BIOS option selects the display device the system uses when it boots. The available options are listed below:

- CRT
- LCD
- CRT + LCD **DEFAULT**

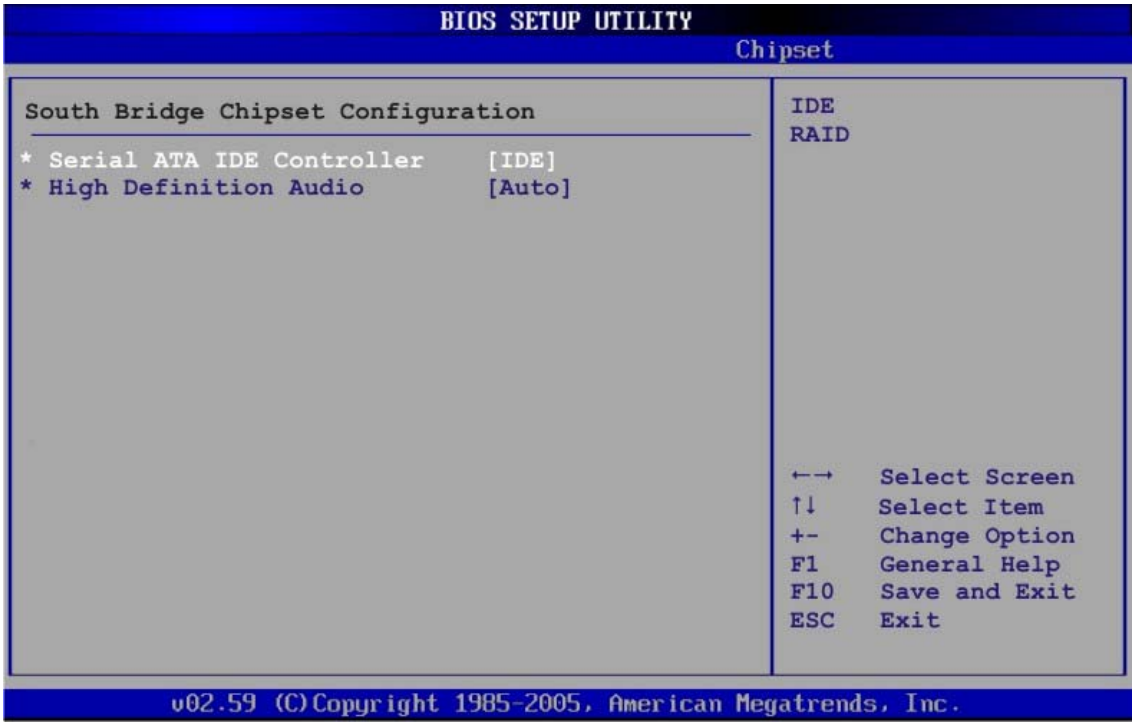
➔ **Panel Type Control By [Auto]**

Use the **Panel Type Control by** option to specify the flat panel type is controlled automatically or manually. The following options are available:

- Auto **DEFAULT**
- Manual

### 7.7.2 SouthBridge VIA CX700 Configuration

The SouthBridge VIA CX700 Configuration menu (**BIOS Menu 18**) enables the Southbridge chipset to be configured.




**BIOS Menu 18:SouthBridge Chipset Configuration**

➔ **Serial ATA IDE Controller [IDE]**

Use the **Serial ATA IDE Controller** option to set the onboard SATA controller. If the RAID function is going to be used this option must be set in the **RAID** mode.

➔ **IDE** The SATA controller is set as an IDE device with an ID at 0181h

➔ **RAID** The SATA controller is set as a RAID device with an ID at 0181h

➔ **High Definition Audio [Auto]**

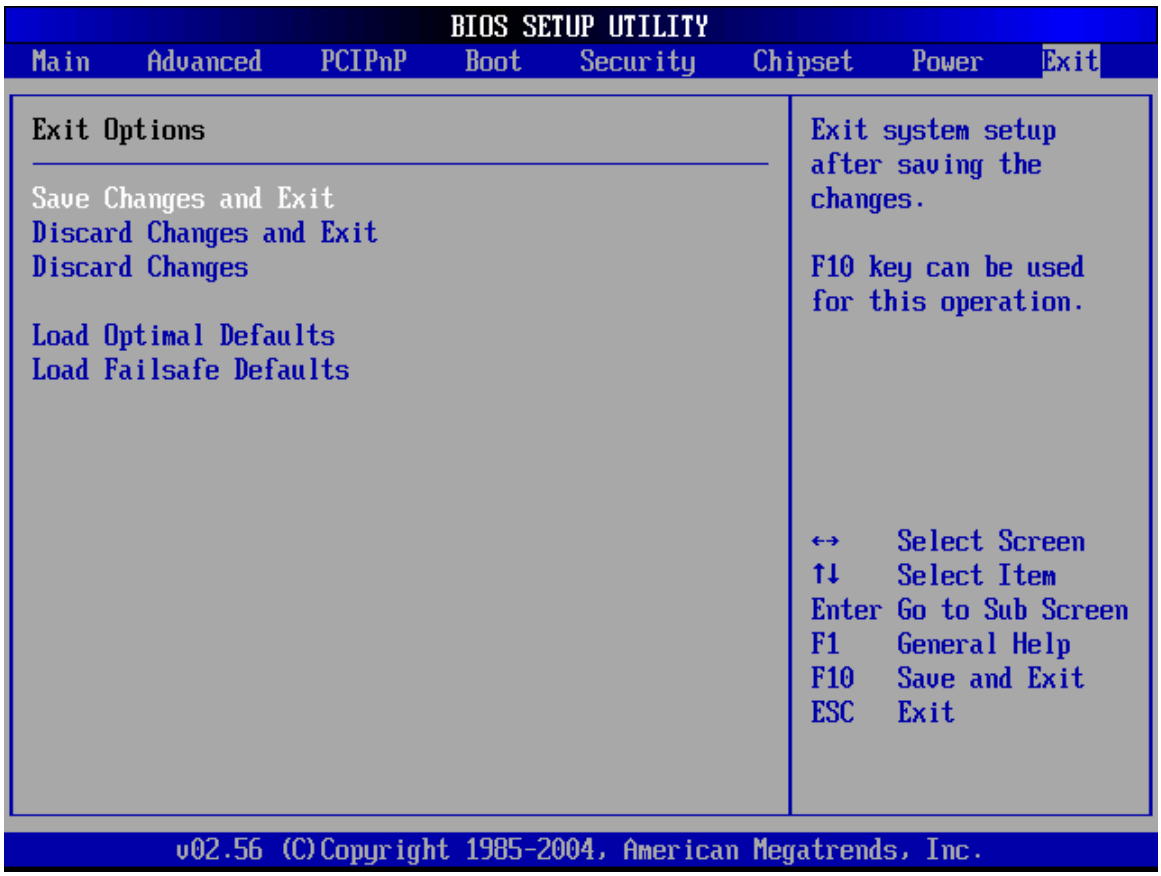
The **High Definition Audio** option enables or disables the HD audio controller.

➔ **Disabled** The on-board HD audio controller is disabled.

➔ **Auto** **DEFAULT** The on-board HD audio controller is automatically detected.

## 7.8 Exit

Use the **Exit** menu (**BIOS Menu 19**) to load default BIOS values, optimal failsafe values and to save configuration changes.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Power Exit
Exit Options
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load Optimal Defaults
Load Failsafe Defaults
Exit system setup after saving the changes.
F10 key can be used for this operation.
↔ Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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**BIOS Menu 19:Exit**

➔ **Save Changes and Exit**

Use the **Save Changes and Exit** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ **Discard Changes and Exit**

Use the **Discard Changes and Exit** option to exit the BIOS configuration setup program without saving the changes made to the system.

➔ **Discard Changes**

Use the **Discard Changes** option to discard the changes and remain in the BIOS configuration setup program.

➔ **Load Optimal Defaults**

Use the **Load Optimal Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

➔ **Load Failsafe Defaults**

Use the **Load Failsafe Defaults** option to load failsafe default values for each of the parameters on the Setup menus. **F8 key can be used for this operation.**

Appendix

A

# System Specifications

## 7.9 Motherboard Specifications

The system comes with an IEI AFLMB-CX2 motherboard. The detailed specifications for the motherboard are listed below.

| Specification | AFLMB-CX2 |
|---|---|
| **Chipset** | VIA CX700M |
| **Processor** | VIA Eden™ 1 GHz ULV |
| **Supported Memory** | One 200-pin 1.0 GB (system max.) DDR2 SDRAM SO-DIMM |
| **System BIOS** | AMI |
| **SSD** | One CF Type II slot |
| **Serial ATA** | One external SATA connector |
| **VGA** | Integrated in the VIA CX700M |
| **LAN** | Realtek RTL8110SC |
| **Expansion** | One Mini PCI |
| **Audio Codec** | High Definition Audio (RealTek ALC888 controller) |
| **USB** | Four external USB 2.0 ports |
| **Serial Ports** | One RS-232<br>One RS-232/422/485 |

## A.1 Screen Specifications

An 8.4” LCD screen is installed in the monitor. Specifications for the screen are shown below.

| | Toshiba Color TFT LCD |
|---|---|
| **Size** | 8.4” |
| **Model** | LTA084C270F |
| **Resolution (pixel)** | SVGA (800 x 600) |
| **Active Area (mm)** | 170.4 x 127.8 |
| **Pixel Pitch (mm)** | 0.213 |
| **Mode** | TN |
| **Number of Colors** | 262K |
| **View Angle (H/V)** | 120/100 |

| | |
|---|---|
| **Brightness (cd/m²)** | 400 |
| **Contrast Ratio** | 400:1 |
| **Response Time (ms) (at 25°C)** | 20 $t_{ON}$ 25 $t_{OFF}$ |
| **Power Consumption (W)** | 6.0 |
| **Interface** | 1ch LVDS |
| **Supply Voltage (V)** | 3.3 |
| **Backlight** | 2 CCFL |
| **Outline Dimensions (mm)** | 199.5 x 149.5 x 12.0 |
| **MTBF** | 50,000 |

## A.2 Touch Screen Specifications

A 5-wire resistive Panjit touch screen is installed in the monitor. Specifications for the touch screen are shown below.

| | **PanJit 1084403B** |
|---|---|
| **Type** | **Analog Resistive Type Touch Panel** |
| **Input Method** | **Finger, Stylus or gloved hand** |
| **Wire Type** | **5-wire** |
| **Maximum Voltage and Currant** | **DC7V** |
| **Position Accuracy** | **Less than 1.5%** |
| **Isolation** | **≥20M ohm** |
| **Resolution** | **4096 x 4096 dpi based on controller resolution** |
| **Activation Force** | **Typical: less than 100g**<br>**Optional: custom activation force and palm rejection** |
| **Controller Interface** | **RS-232 or USB 1.1** |
| **Light Transmission** | **Anti-glare type: 78% - 90%** |
| **Temperature (Typical)** | **Operating: -10°C to 60°C**<br>**Storage: -20°C to 70°C** |
| **Relative Humidity** | **Operating: 20% to 90%RH**<br>**Storage: 20% to 90%RH** |

| | |
|---|---|
| **Electrostatic Protection** | **Touch Panel: 30KV (Contact/Air)**<br>**Controller: 20KV (Contact/Air)** |
| **Surface Hardness** | **3H and above per LIS K5400** |
| **Life (Hitting)** | **More than 10 million for 5-wire touch panel** |
| **Life (Drawing)** | **More than 300 K alphabets for 5-wire touch panel** |
| **OS Compatibility** | **Windows: XP/XP Embedded**<br>**Windows 2000**<br>**Windows ME**<br>**Windows 98 SE**<br>**Windows CE.Net 4.2 (x86 and ARM)**<br>**WHQL certified**<br>**Linux: Fedora Core I/II**<br>**Mandrake 10.0/10.1**<br>**RedHat 9.0** |

## A.3 Wireless Module

A WMG2502 wireless Mini PCI card is preinstalled in the system. Specifications for the wireless module are listed below:

| | **WMG2502 Wireless Card** |
|---|---|
| **Standard** | IEEE 802.11 b/g |
| **Interface** | Mini PCI |
| **Controller Chip** | Realtek RTL8185L |
| **Security** | Hardware-Based Encryption/Decryption Using 64-, 128-bit Wired-Equivalent Privacy (WEP) Keys, WPA and WPA2 are also supported. |
| **Frequency Range** | 2.412 ~ 2.484 GHz |
| **Power Requirement** | 802.11b: TX: 330 mA, Rx:330 mA<br>802.11g: TX: 340 mA, Rx:300 mA |
| **Numbers of Selectable Channels** | USA, Canada (FCC): 11 channels (2.412 GHz ~ 2.462 GHz)<br>Europe (CE): 13 channels (2.412 GHz ~ 2.472 GHz)<br>Japan (TELEC): 14 channels (2.412 GHz ~ 2.484 GHz) |

| | |
|---|---|
| **Receiver Sensitivity** | 802.11g (in 10% PER) -70 dBm(max.) at 54Mpbs ( -65dBm in average)<br>802.11b (in 8% PER) -80 dBm(max.) at 11Mpbs |
| **Range** | Indoors: up to 100meters<br>Outdoors: up to 400meters |
| **Operating Voltage** | 3.3V |
| **Dimensions (L x W)** | 59.75 mm x 44.6 mm |
| **Supported OS** | Windows: 98/SE/ME/2000/XP |
| **EMC** | FCC , CE |

## A.4 VGA Webcam

A digital camera is preinstalled in the front panel of the system. Specifications for the VGA digital camera are listed below:

| | **VGA Webcam (CN0314-MM00-MI01)** |
|---|---|
| **Optical Format** | 1/4-inch |
| **Active Image Size** | 3.58 mm (H) x 2.69 mm (V)<br>4.48 mm diagonal |
| **Active Pixels** | 640 (H) x 480 (V) |
| **Pixel Size** | 5.6 um x 5.6 um |
| **Color Filter Array** | RGB Bayer pattern |
| **Shutter Type** | Electronic rolling shutter |
| **Max. Data Rate/ Master Clock** | 12~13.5 Mps / 24~27 MHz |
| **Frame Rate** | 30 fps at full resolution (640 x 480) |
| **ADC Resolution** | 10-bit, on-chip |
| **Responsivity** | 1.9 V/lux-sec |
| **Dynamic Range** | 60 dB |
| **$SNR_{MAX}$** | 45 dB |
| **Power Consumption** | 30 mA (preview mode) |
| **Operating Temperature** | -20°C~+80°C |
| **PCB Layer** | 4 layers |

## A.5 Power Adapter

A SPI power adapter unit is provided with the system. Specifications for the power adapter are listed below.

| | | | |
|---|---|---|---|
| Output | Nominal | 12.0 V DC | |
| | Regulation | 11.4 V – 12.6 V | |
| | Ripple/Noise | 150 mV | |
| | Min | 0 A | |
| | Max | 4.0 A | |
| Protection | Short Circuit | Yes | |
| | Over-current | Yes (4.8 + 0.6A, -0.6A) | |
| | Over-voltage | Upper trip limit: 13 V ~ 18 V DC | |
| Time | Hold Up | 5 ms minimum | |
| Input | Min. | 90 V | |
| | Nominal | 115V ~ 230V | |
| | Max. | 264 V | |
| | Frequency | 47 Hz ~ 63 Hz | |
| | Efficiency | ≧80% 115 Vac<br>≧80% 230 Vac | |
| Environment | Temperature | Operating | 0ºC ~ 40ºC |
| | | Storage | -20ºC ~ 65ºC |
| | Relative Humidity | Operating (non-condensing) | 20% ~ 80% |
| | | Storage (non-condensing) | 10% ~ 90% |
| Reliability | MTBF | 100,000 hours of continuous operation at 25ºC | |

Appendix

B

# Safety Precautions

**WARNING:**

The precautions outlined in this chapter should be strictly followed. Failure to follow these precautions may result in permanent damage to the ACT-08A-CX2.

## B.1 Safety Precautions

Please follow the safety precautions outlined in the sections that follow:

### B.1.1 General Safety Precautions

Please ensure the following safety precautions are adhered to at all times.

- ***Follow the electrostatic precautions*** outlined below whenever the ACT-08A-CX2 is opened.
- ***Make sure the power is turned off and the power cord is disconnected*** whenever the ACT-08A-CX2 is being installed, moved or modified.
- ***Do not apply voltage levels that exceed the specified voltage range***. Doing so may cause fire and/or an electrical shock.
- ***Electric shocks can occur*** if the ACT-08A-CX2 chassis is opened when the ACT-08A-CX2 is running.
- ***Do not drop or insert any objects*** into the ventilation openings of the ACT-08A-CX2.
- ***If considerable amounts of dust, water, or fluids enter the ACT-08A-CX2***, turn off the power supply immediately, unplug the power cord, and contact the ACT-08A-CX2 vendor.
- **DO NOT**:
  - Drop the ACT-08A-CX2 against a hard surface.
  - Strike or exert excessive force onto the LCD panel.
  - Touch any of the LCD panels with a sharp object
  - In a site where the ambient temperature exceeds the rated temperature

### B.1.2 Anti-static Precautions

**WARNING:**

Failure to take ESD precautions during the installation of the ACT-08A-CX2 may result in permanent damage to the ACT-08A-CX2 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the ACT-08A-CX2. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the ACT-08A-CX2 is opened and any of the electrical components are handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: Wearing a simple anti-static wristband can help to prevent ESD from damaging any electrical component.
- ***Self-grounding***: Before handling any electrical component, touch any grounded conducting material. During the time the electrical component is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring or working with an electrical component, place it on an antic-static pad. This reduces the possibility of ESD damage.
- ***Only handle the edges of the electrical component***: When handling the electrical component, hold the electrical component by its edges.

## B.2 Maintenance and Cleaning Precautions

When maintaining or cleaning the ACT-08A-CX2, please follow the guidelines below.

### B.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the ACT-08A-CX2, please read the details below.

- Except for the LCD panel, never spray or squirt liquids directly onto any other

components. To clean the LCD panel, gently wipe it with a piece of soft dry cloth or a slightly moistened cloth.

- The interior of the ACT-08A-CX2 does not require cleaning. Keep fluids away from the ACT-08A-CX2 interior.
- Be cautious of all small removable components when vacuuming the ACT-08A-CX2.
- Turn the ACT-08A-CX2 off before cleaning the ACT-08A-CX2.
- Never drop any objects or liquids through the openings of the ACT-08A-CX2.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the ACT-08A-CX2.
- Avoid eating, drinking and smoking within vicinity of the ACT-08A-CX2.

### B.2.2 Cleaning Tools

Some components in the ACT-08A-CX2 may only be cleaned using a product specifically designed for the purpose. In such case, the product will be explicitly mentioned in the cleaning tips. Below is a list of items to use when cleaning the ACT-08A-CX2.

- ***Cloth*** – Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the ACT-08A-CX2.
- ***Water or rubbing alcohol*** – A cloth moistened with water or rubbing alcohol can be used to clean the ACT-08A-CX2.
- ***Using solvents*** – The use of solvents is not recommended when cleaning the ACT-08A-CX2 as they may damage the plastic parts.
- ***Vacuum cleaner*** – Using a vacuum specifically designed for computers is one of the best methods of cleaning the ACT-08A-CX2. Dust and dirt can restrict the airflow in the ACT-08A-CX2 and cause its circuitry to corrode.
- ***Cotton swabs*** - Cotton swaps moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas.
- ***Foam swabs*** - Whenever possible, it is best to use lint free swabs such as foam swabs for cleaning.

Appendix

C

# BIOS Configuration Options

## C.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 7**.

**System Overview** ..... **70**

**System Time [xx:xx:xx]** ..... **71**

**System Date [xx/xx/xx]** ..... **71**

**IDE Master and IDE Slave** ..... **74**

**Auto-Detected Drive Parameters** ..... **75**

**Type [Auto]** ..... **76**

**ZIP 77**

**LS-120** ..... **77**

**LBA/Large Mode [Auto]** ..... **77**

**Block (Multi Sector Transfer) [Auto]** ..... **77**

**PIO Mode [Auto]** ..... **77**

**DMA Mode [Auto]** ..... **78**

**S.M.A.R.T [Auto]** ..... **79**

**32Bit Data Transfer [Enabled]** ..... **80**

**Serial Port1 Address [3F8]** ..... **80**

**Serial Port1 IRQ [4]** ..... **81**

**Serial Port2 Address [2F8]** ..... **81**

**Serial Port2 IRQ [3]** ..... **81**

**Touch Controller Address [3E8]** ..... **81**

**Touch Controller IRQ [11]** ..... **82**

**Serial Port4 Address [2E8]** ..... **82**

**Serial Port4 IRQ [4]** ..... **82**

**Remote Access [Disabled]** ..... **83**

**Serial Port Number** ..... **83**

**Serial Port Mode** ..... **83**

**Redirection after BIOS POST** ..... **84**

**Terminal Type** ..... **84**

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High Definition Audio [Auto] ..... 103
Save Changes and Exit ..... 104
Discard Changes and Exit ..... 104
Discard Changes ..... 105
Load Optimal Defaults ..... 105
Load Failsafe Defaults ..... 105

Appendix

D

# Watchdog Timer

**NOTE:**

The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

**INT 15H:**

| **AH – 6FH Sub-function:** | |
|---|---|
| AL – 2: | Sets the Watchdog Timer's period. |
| BL: | Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup). |

**Table D-1: AH-6FH Sub-function**

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

**NOTE:**

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

## Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BX, 05          ;time-out value is 5 seconds
        INT      15H
 ;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP      EXIT_AP, 1     ;is the application over?
        JNE      W_LOOP         ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BX, 0           ;
        INT      15H
;
; EXIT ;
```

Appendix

E

# Hazardous Materials Disclosure

## E.1 Hazardous Material Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

| Part Name | Toxic or Hazardous Substances and Elements | | | | | |
|---|---|---|---|---|---|---|
| | Lead (Pb) | Mercury (Hg) | Cadmium (Cd) | Hexavalent Chromium (CR(VI)) | Polybrominated Biphenyls (PBB) | Polybrominated Diphenyl Ethers (PBDE) |
| Housing | x | O | O | O | O | x |
| Display | X | O | O | O | O | X |
| Printed Circuit Board | X | O | O | O | O | X |
| Metal Fasteners | X | O | O | O | O | O |
| Cable Assembly | X | O | O | O | O | X |
| Fan Assembly | X | O | O | O | O | X |
| Power Supply Assemblies | X | O | O | O | O | X |
| Battery | O | O | O | O | O | O |

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

| 部件名称 | 有毒有害物质或元素 | | | | | |
|---|---|---|---|---|---|---|
| | 铅 (Pb) | 汞 (Hg) | 镉 (Cd) | 六价铬 (CR(VI)) | 多溴联苯 (PBB) | 多溴二苯醚 (PBDE) |
| 壳体 | X | O | O | O | O | X |
| 显示 | X | O | O | O | O | X |
| 印刷电路板 | X | O | O | O | O | X |
| 金属螺帽 | X | O | O | O | O | O |
| 电缆组装 | X | O | O | O | O | X |
| 风扇组装 | X | O | O | O | O | X |
| 电力供应组装 | X | O | O | O | O | X |
| 电池 | O | O | O | O | O | O |

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

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